Lean in Maintenance & Engineering

Implementing Lean to improve Turnaround-Around Time
First Lean Initiative in M&E

5S
Creating a Culture for Good Housekeeping
## 5S Methodology

### Organisational Excellence for Maintenance & Engineering

<table>
<thead>
<tr>
<th>5S Methodology</th>
<th>What does this mean?</th>
<th>How to Implement?</th>
<th>How to Maintain &amp; Improve?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SORT</strong></td>
<td>Remove all un-needed and surplus items.</td>
<td>Systematically touch and identify every item.</td>
<td>Challenge the work area regularly.</td>
</tr>
<tr>
<td><strong>SET-IN-ORDER</strong></td>
<td>A place for everything &amp; everything in it's place when not in use.</td>
<td>Logical &amp; practical labelled storage systems with high visibility &amp; easy access.</td>
<td>End of shift 'Re-set'. Benchmarking for new ideas.</td>
</tr>
<tr>
<td><strong>SHINE</strong></td>
<td>Clean the work areas and storage units.</td>
<td>An initial deep clean of the working environment.</td>
<td>Regular quick cleans to maintain a high standard of cleanliness.</td>
</tr>
<tr>
<td><strong>SUSTAIN</strong></td>
<td>Maintaining the work place organisation and work standards.</td>
<td>Audit the work area to assess progress &amp; to identify deviations from Standards.</td>
<td>Implement corrective actions to address deviations from Standard.</td>
</tr>
</tbody>
</table>
5S

Before

After
## 5S Performance

<table>
<thead>
<tr>
<th>Area Owner</th>
<th>M&amp;E OFFICES - H6</th>
<th>STORES - H6</th>
<th>320 Team - H6</th>
<th>330 Team - H6</th>
<th>Engine Compound - H6</th>
<th>Tool Store - H6</th>
<th>Line Maintenance</th>
<th>Wheel Change Trucks</th>
<th>Mobile Work Shops</th>
<th>Date</th>
<th>5S Score</th>
<th>Target</th>
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<tbody>
<tr>
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### 5S Score - M&E

![5S Score - M&E Graph](image-url)
Lean Win: Reduced Engine Runs

![Airplane on the tarmac with the Aer Lingus logo]

**Engine Runs/Mth - Narrow Body - Dublin**

<table>
<thead>
<tr>
<th>Month</th>
<th>Engine Runs</th>
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<tbody>
<tr>
<td>Aug-11</td>
<td>60</td>
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<tr>
<td>Sep-11</td>
<td>40</td>
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<td>Oct-11</td>
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<td>Nov-11</td>
<td>40</td>
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<td>Dec-11</td>
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</tr>
<tr>
<td>Jan-12</td>
<td>10</td>
</tr>
<tr>
<td>Feb-12</td>
<td>20</td>
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Lean Win: Reduced Paperwork Errors

Paperwork Errors DUB - All Crews

<table>
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<th>Month</th>
<th>Errors</th>
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<td>Jul-12</td>
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<tr>
<td>Aug-12</td>
<td>25</td>
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<td>Sep-12</td>
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<td>Oct-12</td>
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<tr>
<td>Nov-12</td>
<td>10</td>
</tr>
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<td>Dec-12</td>
<td>5</td>
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<tr>
<td>Jan-13</td>
<td>10</td>
</tr>
<tr>
<td>Feb-13</td>
<td>5</td>
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</tbody>
</table>
Innovation: Wheel Change Trucks
Innovation: Mobile Work Shops
Big Business Opportunity

- A330 A-Check
- Shannon to Dublin
- Turnaround Challenge
- Lean Project
Lean Project: 330 A-Check

- Sponsor
- Owner
- Facilitator
- Team
- A-Check Crew
- Stakeholders
- 28 Sub Projects
Visibility Board

• Visibility of:
  - A-Check progress
  - KPI’s
  - Process Improvements
• Focal point for the A-Checks
• Meeting place for Team
• Post-Check Meetings
Preparing for the A-Check: Set Up Plans

330 A-Check: Set-Up Plan

for Landing Gear section

**Main Gear**

4. Open Main Gear Doors
5. Position Wheel Well Stands X 2
6. Position Steps for Wheel Well Stands X 2
7. Insert Main Gear Door Locks X 2
8. Position Horse Boxes X 3
9. Position Airline PIGs with Reels X 2
10. Insert RAT Lock using an MWP
11. Position Lights on Wheel Stands X 4
12. Position Five Step Stand X 1

**Nose Gear**

1. Open Nose Gear Doors
2. Position Five Step Stand X 1
3. Insert Nose Gear Door Locks X 2
Set-Up for Engine Section

- Fit-for-Purpose Stands
- Mobile Lights
- Oil Disposal Unit
- Tool Boxes
- Mobile Power Supply
5S – Tool Boxes

- Company Tools
- Task Focus
- Foam Inserts
- Visibility
- Instant Access
- Controls
- Compliance
Vending M/C’s for Consumables Materials

- 24/7 Access
- Zero Stock-Outs
- 2,5000 Stock Items
- Pay at point-of use
- 40% Cost Reduction
Mobile Work-Stations

- Instant access to electronic documents & printers
- Promotes A-Check efficiency
- Supporting the Aircraft Engineers
Issues Board

- Capture every Process Issue in real time
- Highly Visible process
- Team Solutions agreed by consensus
- Voluntary Ownership
- Target dates
- Every Issue closed reduces the Noise in the Process
Engaging Stakeholders

• All Stakeholders
• No Emails
• No Phone Calls
• Face-to-face Meetings
• On the Hangar Floor
• Real Engagement
• Building Trust
• Making Progress
A330 A-Check Implementation 2013

Lean Implementation
Project Plan & Time Line
A330 A-Check

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>34.0 Hrs</td>
<td>25.9 Hrs</td>
<td>23.0 Hrs</td>
<td>22.3 Hrs</td>
<td>22.0 Hrs</td>
<td>20.7 Hrs</td>
<td>14.6 Hrs</td>
<td>14.0 Hrs</td>
<td>13.7 Hrs</td>
<td>12.7 Hrs</td>
<td>12.1 Hrs</td>
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</table>
A330 A-Check Deliverables 2013 - 2014

330 A-Check Turnaround Hours
Best Turnaround Per Month

330 A-Check Manpower Hours

Asset Utilisation
Two X New Flights to Faro
Supporting the Operation: First Wave Departures

- New Lean Project
- First Wave Departures
- M&E supporting the Operation
The Problem

<table>
<thead>
<tr>
<th>Background to Project / Problem Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor OTP</td>
</tr>
<tr>
<td>Very little coordination</td>
</tr>
<tr>
<td>Hand Baggage / Bags Policy is a major issue</td>
</tr>
<tr>
<td>Frustrated Customers</td>
</tr>
<tr>
<td>Local ATC Ground Movement</td>
</tr>
<tr>
<td>We measure the delays and we do not focus on fixing the problems.</td>
</tr>
</tbody>
</table>
# First Wave Stakeholders

<table>
<thead>
<tr>
<th>Stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check In Desk</td>
</tr>
<tr>
<td>Maintenance &amp; Engineering</td>
</tr>
<tr>
<td>Fuelling</td>
</tr>
<tr>
<td>Catering</td>
</tr>
<tr>
<td>Cabin Crew</td>
</tr>
<tr>
<td>Gate Agents</td>
</tr>
<tr>
<td>Ramp Services</td>
</tr>
<tr>
<td>Pilots</td>
</tr>
<tr>
<td>Red Caps</td>
</tr>
<tr>
<td>Push Back</td>
</tr>
<tr>
<td>ATC</td>
</tr>
<tr>
<td>IOC</td>
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</table>
**Project Phases**

### Phase 1: New Process - Design
- Project Charter
- First Wave Observations
- New Process Design
- New Process Approval

- Mar-14

### Phase 2: New Process - Development
- Trials
- Process Improvements
- HIRA
- Agree the Go Live Date

- Apr to Jun 2014

### Phase 3: New Process - Implementation
- Communication Plan
- New Process Visibility
- Mentoring & Training
- New Process Metrics
- Go Live
- First Wave Reviews
- Management Support
- Continuous Improvement

- Jun to Aug 2014
5 Day Lean Project Plan to produce the New Process

Day 1  -  Team Assembly

- Introduction to Lean
- Project Charter
- Process Mapping - Current State

Day 2  -  Observations: First Wave Departures

- New Process - First Cut

Day 3  -  New Process - Final Version

Day 4  -  Stand Plan

- Luggage Policy

Day 5  -  Update the Operations Team

- Finalise Project Proposal
Goal

• New Fit-for-Purpose Process

• Total Customer Focus

• Fix what is completely within our control i.e. up to ‘Ready to Push’ (RTP) at -10 for First Wave Departures.

• Strive to achieve a 100% RTP performance.

• Identify and influence opportunities that are outside of our control i.e. what happens between RTP & STD.

• New Process to be Safe, Simple & Fluid.

• Avoid complex IT solutions & high Capital spend.
## Communication: Process Pictorial – High Level

### First Wave Departure Process - DUB

<table>
<thead>
<tr>
<th>Revision</th>
<th>RTP</th>
<th>STD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
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<td></td>
</tr>
</tbody>
</table>

**Issue Date:** 01 Jul 2014

### Process Stakesholders

#### CHECK IN DESK
- DME Management on Transferlite Flights

#### M&E
- Two Check complete: Loadbook signed, GPU connected
- Rapid Response Vans in site

#### FUELING
- Fueling Complete

#### CATERING
- Catering Complete

#### CABIN CREW
- Onboard
  - Aircraft identity cards AIP
  - Ready to receive PAX
- Boarding Complete
- Headcount Complete
- Close the Passenger Door

#### GATE AGENTS
- First Pre-board announcement
- Green Light
  - Boarding complete
- In position to remove the Airbridge
- Remove the Airbridge

#### Ramp Services
- Last containers delivered to aircraft
- Container loading complete
- Signed Load Plan to Red Cap. Bags taken from cargo
- Commerce No. Must passenger policy if required
- Under wing doors are closed
- Remove GSE & Cones

#### PILOTS
- Arrive at aircraft
- Receive ACARS load sheet
- Ready to Call for Push

#### RED CAP
- Zero fuel weights in cockpit via ACARS load
- Final decision on late PAX

#### PUSHBACK
- Arrive at aircraft
- Disconnect GPU, Connect Tractor & Headset
- Remove Chocks

#### AFC
- Give Permission to Push

---

**Previous Day:**
- LH OOD to DAA by 11:30
- SH OOD to DAA by 12:00

---

**RTP = Ready to Push**

**STD = Scheduled Time of Departure**

---

**Stakeholders are requested to notify the Red Cap in advance if they think that the Team will not achieve RTP at -10. The Red Cap can be contacted via Station Control at Ext. 63169 or Ext. 62051.**
Summary of the New Process

• Red Cap owns the First Wave Departure Process.
• Process is designed for success.
• Stakeholders will share the same goal: RTP at -10.
• Stakeholders will work as a cohesive Team to agreed Timelines.

• Green Light Boarding.
• Boarding at -35.
• Focus on achieving 100% RTP to achieve STD.
• Mobile rapid-response Maintenance Units.
• Baggage Management.
• Support the DAA Stand Plan.
• Daily ‘First-Wave Review’
Early Results

First Wave Departures DUB
Push back at STD

Target - Red Actual

Jan-14 Feb-14 Mar-14 Apr-14 May-14 Jun-14 Jul-14 Aug-14 Sep-14 Oct-14 Nov-14 Dec-14
Next: Aircraft Turnarounds at Bases & Out Stations

- Natural follow on from the First Wave project
- M&E Support
- Project is in progress
What’s Next in M&E?

Lean Implementation → Value Streams
Traditional Operation

- Functional approach
- Departmentalised
- Frictional
- No visibility of Customer
- Unaware of my impact
- ‘I’ve done my bit!’
- ‘That’s not my responsibility’
Value Stream Approach

- Customer Focus
- Product Families
- Value Streams
- Teams
- Shared Goals
- Real Engagement
- Up-skilling
- Job Satisfaction
What will change?

What will we do Differently?

- Focus on Aircraft Type across a Value Stream
- Asign the relevant resources to a Core Team
- The Core Team will have adjacent Office Desks
- Create a real Team Working environment
- Set Goals & Metrics for the Team
Commitment to Lean Training & Education
Learning through Benchmarking
Thank You