

Case Study – Line Balance & Std. Work Implementation

Aggreko Manufacturing

Dumbarton



Introduction

Aggreko are a FTSE 100 company who design and manufacturer temporary power & temperature control solutions for a range of global applications and are the sole manufacturer for their Group.

VA were originally asked to construct and facilitate a 5S Program on their manufacturing shop floor.

While working with Aggreko management and shop floor operators, VA identified opportunities on the high volume generator line to increase efficiency by the reduction of waste within the assembly process and to improve overall process control.

A “step change” increase in demand had put additional pressure on the current assembly line, leading to variations in daily output which in turn resulted in bottlenecks in the Test and Final Inspection processes, additional labour / transportation costs and an increased number of build related quality issues.



Solution

VA recommended a 3 month pilot Line Balance & Standard Work Implementation plan with the following objectives:

- Implement an efficient labour utilisation process and therefore reduce labour costs per set
- Create a “smoothed” pulse production
- Implement basic Standard Work to generate capable and repeatable processes
- Implement a daily “detractor” measurement process to identify lost time
- Facilitate employee involvement to generate line ownership and accountability

In order to ensure full participation and ease of handover to Aggreko personnel, it was agreed with the Senior Management Team that the project would be supported by both VA and an Aggreko CI Engineer. This also ensured that the original 5S program kept to its original timeline as both projects had sufficient resource in place to run in parallel.



Implementation

Below is a selection of specific actions carried out :

1. Employee and Line Management training on principals of Line Balance & Standard Work.
2. Timings capture of the current process steps and record them in a Line Balance stack chart (in this instance, process steps were defined as either Mechanical or Electrical tasks).
3. Break down work elements and identify as value-adding and non-value adding.
4. Elimination of the non-value actions.
5. Balance the stack chart by moving some of the more basic tasks from one operator to the other.
6. Break the chart in to defined stages that can easily be taught and followed.
7. Train the operators in the new process, measure several runs to check if balanced and make any final adjustments to ensure process is repeatable and sustainable.
8. Implement Operator Target and Detractor visual management boards.
9. Implement a Daily Sunrise meeting to review the previous days performance and a Weekly Line meeting to review the top detractors for the previous week and facilitate further continuous improvements.

Line Measurement & Control

Standard Work sheet

aggreko 1MW Line - Standard Work Sheet Op Description: Mech. 2

Seq.	Work Element	Time (min)	Quality	Safety	AP
1	Collect Alternator bolts & washers and prep	5			A
2	Clear cables from bedplate to allow Alternator fitment	1			
3	Remove drive plate access cover from Alternator	3			
4	Collect lifting beam and crane & connect to Alternator	6	A,B		
5	Lift Alternator into position & locate 1 x drive plate bolt	5		C	
6	Fit bellhousing bolts and torque	9	A,B		C
7	Let weight off crane, collect and fit 4 x hold down bolts	7			B
8	Return crane & lifting beam	15	A,B		
9	Collect torque wrench	1		B	C
10					
11					
12					
13					
14					
15					

Target Cycle Time (mins) 52

Quality Check	Safety Check
A Refer to torque settings sheet	A Check crane has current, in date check tag attached to pendant
B Insure wrench is within calibration and shows no sign of damage	B Care to be taken when opposing overhead crane
C	C Care to be taken to avoid anything being trapped between alternator and engine faces, (hands, cables etc.)
D	D
E	E
F	F

Cycle Breakdown Chart

Reference Points

- A/ 16off 1/2"UNC x 1 1/4" spring, plain & form C washer
- B/ 4off M20 x 80, spring, plain & form C washer
- C/ Stored on 1MW Line - Shadowboard 1

Visual Management Board

50G3 Assembly - Line 1

Detector Code	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total
6								
11			15					
20				10				
					15			

50G3 Target / Actual Board

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total
Start Week	11	10	5	1	14			
Target End Stage	6	4	3	10	9			
Actual End Stage	4	4	3	15	10			
Delta	3	0	0	1	1			
Cum. Delta	3	3	3	4	5			

List of Detractor Codes

1 Unside Stock Missing	11 Container Rework
2 Damaged Unside Materials	12 Engine Rework
3 Awaling Welder	13 Bedplate Rework
4 Awaling Alternator	14 Alternator Rework
5 Awaling Bedplate	15 Trailing New Parts/Process
6 Awaling Crane	16 Trailing
7 Awaling Engine	17 Unside Trailing Missing
8 Providing Off Line Assistance	18 Meetings
9 Missing Off Line Interceptor	19
10 Emptying Oil Catcher	20

AWAITING CONTAINER PARTS NOT COLLECTED



Results

Savings

- Recorded Labour Hrs per set reduced by 36%
- **2009 volume Savings - £308,000**
- **2010 Potential Savings - £343,000**
- **Ongoing savings year on year!**

Benefits

- **Pulse Production established – 1 x set every 12hrs (cycle time previously ranged from 15-24hrs)**
- **Capacity Planning simplified through fixed labour allocation**
- **Standard Work introduced to shop floor**
- **Process Improvement Projects initiated through Detractor analysis**
- **Performance KPI's established**
- **Autonomous Line Management established**

As well as realising the above benefits, there are many other spin-off benefits from this process. These include

- improved Quality (gained by having documented & repeatable processes),
- improved accuracy of planning (pulse production ensures throughput times are rigid),
- no ambiguity of work content (everyone is doing the same amount of work) and a solid basis for training (one way for everyone – bad habits or bad practices cannot enter the process).

This model is now being implemented by Aggreko in all other high-mid volume production lines