April 2016

Case Study

How using *lean* techniques can establish correct employee numbers and skills

- UK equipment Refurbishment Company

Learn. Improve. Achieve

Summary

Challenge

Equipment Refurbishment Company wanted to overhaul and expand its operational functions.

Root Cause

It needed to define its new skill requirements and numbers.

Output

Extensive business re-structuring.

Results

Improved operational efficiencies and increased productivity.

Case Study

Lean six sigma

How using lean techniques can establish correct employee numbers and skills.

Overview

The primary function of a business is to exchange goods and services for money in order to generate profit.

Within this process, the two main cost areas stem from both raw materials and labour. Through price negotiations, a business can reduce raw material costs (along with overheads) where possible, but since every employee represents a substantial amount of money, labour also needs to be minimised if overall costs are to be minimised.

So, how many people should you employ? And with what skills? The following case study demonstrates how applying *Lean* can answer these questions.

Define

- **Business goals are to sell products or services for profit.**
- **These must be off-set against 'material costs' and 'people costs'.**
- **Lean organisations seek to remove process waste and tackle the cost of poor quality so as to increase productivity.**

The goal of a business is to exchange goods or services for money – and, typically, the business will seek to sell its output for profit.

Profit can be defined as: '*the financial gain between the amount earned and the amount spent in buying, operating, or producing something*' - and in the broadest sense, this is a function of materials and people. Within the definition of profit, '*material costs*' include fixed and variable costs – which means that raw materials, overheads and utilities are included within material costs.

With regard to '*people costs*', these comprise salary, pension contributions and overtime, as well as employment expenses such as tax and employer National Insurance. Thus every employee represents a clearly defined

Define

individual amount - so to reduce costs, organisations typically seek to reduce their headcount.

However, *lean* organisations seek to remove process waste - and by tackling the '*cost of poor quality*', '*Lean*' projects focus on removing process waste and increasing productivity.

By knowing just a few simple facts, it is possible to determine the number of operators required to meet customer demand. This knowledge, (plus understanding your processes and knowing your customer requirements), will enable you to employ the correct number of resources with the right skills. This presents two questions:

1. How many people do you need?
2. What skills should they possess?

Measure

- **UK company refurbished three types of equipment and wished to increase this to four.**
- **To determine skills required, a detailed understanding of work content and cycle times was needed.**
- **Total cycle time can be defined as total of all individual operations within the value stream.**

This case study is based on a UK company which refurbishes three types of equipment. To ensure anonymity, we have elected to call these three product groups '(A)', '(B)' and '(C)'.

The company wishes to increase its market offering by refurbishing a further product group '(D)', taking their offering to four distinct groups. To determine the skills required in these four offerings, we need to both understand the work content and determine the '*cycle times*'. The cycle time is '*the time elapsed from the beginning of an operation until its completion*', and is often thought as being '*button-to-button*' - in other words, it is the processing time. The cycle time should not be confused with TAKT time, which is a measure of customer demand. The Total Cycle Time (TCT) is the total of all of the individual operations within the value stream.

Analyse

The company refurbishes fifty different types of machines - and as previously mentioned, these now broadly split into four groups - but how was this grouping determined? By identifying the key process stages and by completing a desk exercise, it's possible to identify similar products that can be thought of as being broadly from the same family.

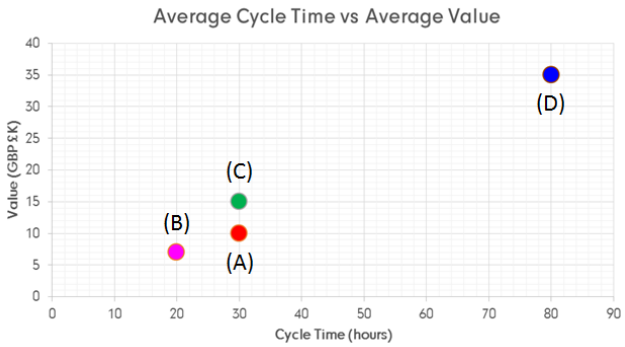
From the table below, we can see that product groups 'B' & 'C' are very similar. Whilst product group 'D' is similar to 'B' & 'C', there are a few more stages involved in the refurbishment process of machinery in product group 'D'. Consequently, it can probably be regarded as a sub-set of the 'B' and 'C' family.

Analyse

- Fifty types of machines for refurbishment fell into four groups.
- By identifying key process stages and through desk exercises, products in the same families could be identified.
- It was then necessary to determine a business plan and business strategy.

Product group 'A' doesn't seem to have very many similar processes to the other groups, so it can be considered as a completely different group. Consequently, its operators require an entirely different skill set.

	Group			
	(A)	(B)	(C)	(D)
Process 1	x	x	x	x
Process 2		x	x	x
Process 3	x	x	x	x
Process 4	x	x	x	x
Process 5	x			x
Process 6			x	x
Process 7	x			x
Process 8	x			
Process 9	x			



Having understood the product families, it was then necessary to determine the business plan and business strategy. Based on volume, the client needed to decide if they would flow '*volume*' or '*value*'. Knowing the cycle times (in which all cycle times were based on one operator) and the replacement value for each of the fifty different machine types, the project team plotted cycle time against value. The above graph illustrates the variance between volume and value, '*value*' taking most time and '*volume*' being the quickest to produce (but having the least capital return). Taking 80 hours to process, product group 'D' has the highest return, but takes the longest time to put through the operation.

Conversely, product group 'B' is much quicker - but has the lowest return. Therefore, in a given time-frame, you can expect to get four 'B' products for every one 'D' product – and, since the average value of 'B' is roughly a quarter of 'D', the business would be in the same net position. The dilemma as to whether to flow '*volume*' or '*value*' still applies.

Since product group 'D' is new to the business, it is feasible that (over time) the cycle time will be reduced, so that the business must focus on customer expectations. As such, the business cannot favour one group alone - it must place equal emphasis all product groups. However, since the volume is unknown, how will the business determine its labour requirement? In lean theory, it is possible to determine the number of operators required by applying the following:

Number of operators = (Total Cycle Time) / (Available Production Time / Demand)

If the customer demand is known, it is fairly simple to complete the calculation – and in this scenario, the business is attempting to grow, though its future demands are unknown. Nevertheless, the future state of the business can be modelled, since the working week is fixed. So, taking an average cycle time for each group, the only variable is volume. Therefore the number of operators for varying the volumes can be determined: The table illustrates that the processing of 250 type 'A' units will require 5.56 operators, whilst the processing of 100 units of type 'C' requires just over two operators.

Volume	(A)	(B)	(C)	(D)
50	1.11	0.91	1.05	2.71
100	2.22	1.83	2.09	5.43
150	3.33	2.74	3.14	8.14
200	4.45	3.65	4.19	10.86
250	5.56	4.56	5.23	13.57
300	6.67	5.48	6.28	16.29
350	7.78	6.39	7.32	19.00
400	8.89	7.30	8.37	21.72

Improve

- Post-analysis business re-structure took place, establishing 5 new leadership roles.
- Business became more structured, and it was clear which skills were required for each role.
- Efficiency increased, staff turnover decreased, and more 'right first time' units were completed.

With the analysis complete, the business embarked on a programme to restructure, which resulted in the creation of five new leadership roles: three team leaders; a quality lead - plus a new technical role focused on both writing Standard Operating Procedures (SOPs) and delivering internal training.

As a result, the business was more structured, recruitment gaps were more self-evident - and it became clear which skills were required for each role. As a result of this activity, efficiency increased, staff turnover decreased and the business unit was able to increase the number of units completed '*right first time*', delivering a higher-quality product to the customer.

Control

- Management must lead commitment to *Lean*.
- *Lean* theory can dramatically influence people costs.
- *Lean* theory can also ensure employment of the right number of people with the right skills in the right roles.

Our *Lean* implementation might appear to be just another programme; however, management must lead the commitment to *Lean*, as well as demonstrating how and why it is different; in fact the entire organisation's commitment to *Lean* will mirror the commitment of top management.

By focusing on the process, this case study attempts to illustrate how applying *Lean* theory can dramatically influence your people costs, whilst helping to ensure that you have the right number of people with the right skills in the right roles.