

The Lean Library

The British Library (BL) is the national library of the UK and was formed by an Act of Parliament in 1972 bringing together the British Museum, National Lending and the National Science libraries under the auspices of a Non Departmental Public Body (NDPB). The organisation's purpose is to preserve the nations published literature and make it available to researchers to support research and knowledge creation.

There are two sites, St Pancras London with 900 staff and Boston Spa, Yorkshire with c600 staff;

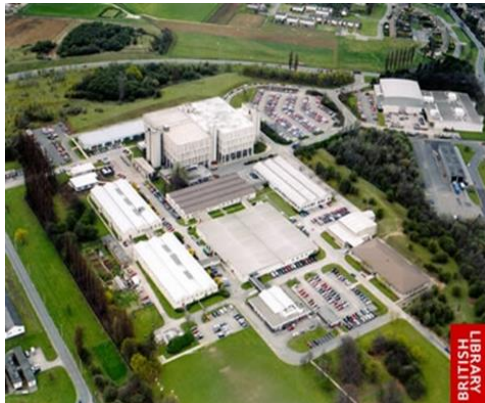


Fig 1 BL Boston Spa, West Yorkshire



Fig 2 BL St Pancras, London

Access to the collection is either remotely via the Document Supply Service or on site via the Reading Rooms where it is also possible to visit permanent exhibitions displaying items such as the Magna Carta, Diamond Sutra (the world's earliest dated printed book), Laurence Olivier's script for *Macbeth* and the newly acquired *Mystère de la Vengeance* manuscript.

Providing access services is becoming increasingly challenging as budgets reduce, customer expectations increase and technology develops apace. Lean management was adjudged to be one method of ensuring service levels exceed user expectations whilst continuing to reduce budgets.

The journey to lean

Lean Management is a collection of activities based upon the teachings of Taiichi Ohno who developed the Toyota Production System (TPS) during his tenure with the company. His challenge was how to develop a manufacturing system with minimal capital investment. His ideas suggested that rather than produce to stock and sell, they should produce “just in time” to the customer order. This concept together with other elements of this system have become familiar for example, *muda* (the elimination of waste), *jidoka* (the importance of quality) and *kanban* (the system of just-in-time stock control).

Ohno, Taiichi (1988), *Toyota Production System: Beyond Large-Scale Production*, Productivity Press, [ISBN 0-915299-14-3](#). Ohno, Taiichi (1988), *Workplace Management*, Productivity Press, [ISBN 0-915299-19-4](#). Ohno, Taiichi (2007), *Workplace Management*. Translated by Jon Miller, Gemba Press, [ISBN 978-0-9786387-5-7](#), [ISBN 0-9786387-5-1](#)

TPS has evolved into a Lean management philosophy which has subsequently helped numerous manufacturing companies deliver “more with less” and increasingly, as budgets cuts bite, more and more public sector organisations are adopting the approach too.

Many interpretations of Lean have been written covering the various tools, techniques and behaviours. In terms of how they could be translated into the context of what the BL does, it was summarised into three basic definitions:-

- ① **Focus on the needs of the customer, listen to them and tailor our services to suit.**
- ② **Have a passion for reducing waste and non-added value activities.**
- ③ **Give everyone a voice and the opportunity to make change happen.**



Customer first

Japanese automotive suppliers place great importance on the customer first principle with emphasis on prevention and “right first time”. Often in the public sector we forget that we are providing services for customers and that those services should be designed and delivered with the customer in mind.

In order to repackage how customer services were provided, we decided to adopt the Customer Service Excellence (formerly Charter mark) as a standard for defining and improving the way in which we interact with customers on the front line. The BL Customer Services team managed the project to deliver certification in 2011 and are now looking to increasing the scope to include other BL services. Strong influencing factors that were identified were – Leadership, Employee Satisfaction and Process Management – see fig 3;



Fig 3. Leadership, Employee Satisfaction and Process Management were deemed very important in delivering excellent services.



Fig 4- The Customer Service Excellence logo

Elimination of waste and non-added value

We considered the classic 7 wastes as defined by Taiichi Ohno and noted that in the manufacturing world, inventory is the worst waste of all as it hides problems such as - defects, rework, out dated products etc. whilst also tying up capital.

A service function is by its nature reactive and whilst it doesn't carry stock, where no targets exist, then we are effectively hiding "waste" in the way that stock does and thereby inhibiting productivity improvement.

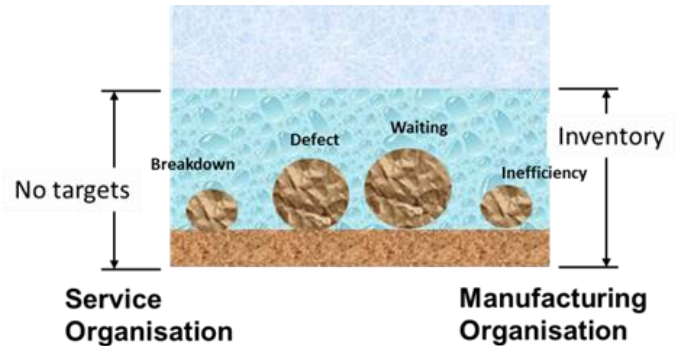
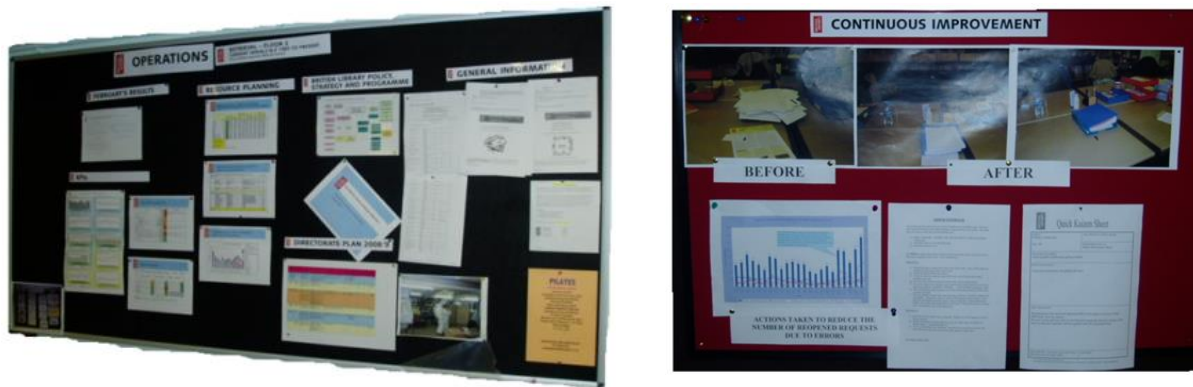


Fig 5 – Service organisations without targets are inhibiting productivity in much the same way inventory does in the manufacturing world

In order to trial this approach we selected the Document Supply Service based at Boston Spa¹ as a candidate for our improvement activities.

The first step was to redefine the Key Performance Indices (KPIs) for the Document Supply service. Japanese automotive companies build KPIs in a hierarchy or a "hoshin" such that at every level they are aligned. They focus on the *vital few* ensuring they represent - Quality, Cost, Delivery, Safety and Morale. Likewise we redefined the KPIs, subdivided by area and displayed alongside improvement activity boards. These noticeboards are a focal point in each area and act as the backdrop of "birdtable" team briefings promoting accountability, responsibility and ownership.



Figs 6 – Key Performance Indices (KPIs) and Continuous Improvement activities displayed side by side in operational areas.

It is vitally important that the key metrics are charted in order to understand trends². In some cases we utilised Statistical Process Control (SPC)³. in order to understand the *normal variation* versus the *abnormal variation* which in turn helped steer improvement activities.

¹ The Document Supply Service has provided documents to remote users for over 40 years. In 1999 the service peaked at 4m request, but over the years the service has declined year on year due to the internet, search engines and publisher big deal arrangements. Following improvement activities a new modernised service has been developed - much the same as an automotive "facelift".

² Most BL services see trends commensurate with the academic year namely peaks in March and November.

³ Oakland, John S (1986), *Statistical Process Control*, Butterworth Heinmann, ISBN 0 7506 5766 9

Having redefined the metrics and set achievable targets, a Resource Planning Model could be developed; the purpose being that we could easily plan the requisite staff numbers commensurate with the predicted demand. It became apparent that the difference between a trough (the quietest part of the year) and a peak (the busiest) amounted to 40 staff! As a public sector body we could not use excessive overtime or turn orders away therefore with staff and trade union involvement, we looked at flexible working. As demand varied area by area, we adopted the principle whereby colleagues would move to where the actual work was. This required a number of things:-

- Standard Operating Procedures (SOPs) to ensure that all areas worked exactly the same way.
- Training in multi-skilling so colleagues could undertake various jobs.
- Redesigned the various store layouts so the “optimum template” was applied in every area.

The outcome delivered the capability to balance capacity with demand, by area and remain productive throughout the year.

When re-engineering services we considered the TPS approach in particular the “pull” system, i.e. producing or delivering to the customer order. Libraries are in fact service organisations and therefore responding and supplying to customer demand, just in time. The Japanese concept of Heijunka (lot formation) was in use within the stores areas as colleagues prepared optimum batches of customer requests commensurate with the speed of service together with the most efficient retrieval method.

We also looked at the U-Shaped cell” – see Fig 7 alongside.

The arrangement of the layout allows the easy movement of colleagues around the area thus enabling the working at multiple work stations. This prevents “islands” of disconnected activity and if demand falls away, then staffing can be reduced pro rata thus balancing income and cost.

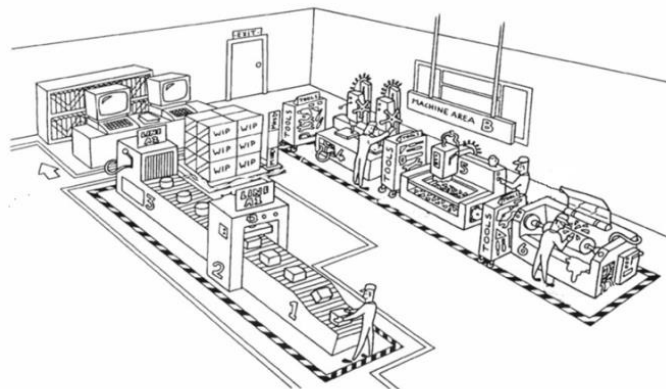


Fig 7 – the U Shaped Cell layout allows staff to work at multiple locations in order that staff resource can be balanced commensurate with demand.

Figure 7 also illustrates the following TPS principles:-

- Clear visual controls and separation – Working, Walking and Storing.
- Use of the 5s tool via shadow-boards⁴
- The items are coming off the “pitched” conveyor belt according to the takt time i.e. the rate in which the customer is demanding or “pulling” them.
- The temporary store between the two lines is able to balance the differing throughputs and act as a buffer, this is called a Kanban.
- Even the manuals in the shelf have a line on the spine of the binders to ensure they are filed in the correct place.

⁴ 5s is a tool used to organise the workplace. Items are stored in accordance with frequency of use. They are given an address to aid easy location much the same as a cutlery drawer.

We developed an internal training workshop on 5s. It was a logical place to start continuous improvement (team based kaizen) activities. We used 5s as a catalyst for change as it acts as a tool to define the *current* situation and clarify workflows. – see fig 8 below;

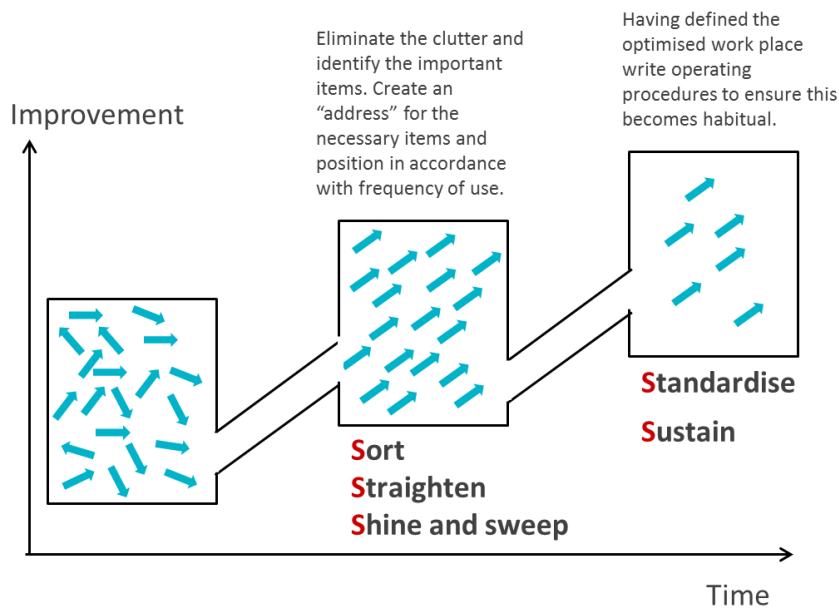


Fig 8 – the 5s tool is a good place to start continuous improvement activities

This change delivered a 25% productivity improvement for the service and formed the foundation of a business process reengineering exercise, thus preparing the ground to making the service viable and “fit for the future”.

Engagement

In order to properly engage with colleagues, a transformational change approach was taken inasmuch colleagues were consulted every step of the way and training interventions were designed such that colleagues were empowered to “make a difference”. Initially we encountered cultural resistance, such as – “we don’t have time” or “we’ve done CI before along with TQ back in the ‘90s etc”. This was overcome by developing a “homemade” approach and by selling the success via an early pilot. The change process integrated “top down” and “bottom up” by:-

1. Top down - corporate change projects(Prince 2 - Business Cases).
2. Bottom up - Cross functional team based kaizen for looking at more complex problems requiring a structured investigation⁵. In order to assist cross functional improvement teams and assist in the systematic approach to problem solving (rather than moving directly to solution), see template in fig 9 below;
3. Bottom up - Some problems were immediately obvious and a solution was easily identified. Here we designed the “Quick Kaizen” template. This is a form that basically documents the “before and after”, whilst acting as a record of process change.

⁵ We promoted the application of Deming’s Plan, Do, Check, Act approach in order to investigate problems and before identifying the “solution” spend time on understanding the root cause before “testing” the theory.

BRITISH AIRWAYS BUSINESS IMPROVEMENT GROUP

ACT PLAN DO CHECK

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Theme Description																																																																			
Team Leader																																																																			
Team Members																																																																			
2. & 3. MEASURE OF SUCCESS – select a measure that reflects the current problem & can demonstrate improvement at the project completion. Add a target line.																																																																			
4. COLLECT DATA – relevant data that reflects process delivery. This may take the form of tally charts, scatter charts, SPC charts etc.																																																																			
5. ANALYSE DATA, ESTABLISH ROOT CAUSE – crunch the data using tools such as Pareto, Fishbone, 5why, fault tree etc. Brainstorm to sort & prioritise according to groups consensus.																																																																			
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Fig 9 The Business Improvement Group template was designed to help teams systematically work through complex problems using the Plan, Do, Check, Act principles.

Alongside the preparation of templates we devised a training plan for colleagues. This comprised of:-

- A half day 5s workshop
- A one day course on problem solving for all colleagues.
- A one day course for managers on team building and facilitation

The one day courses were designed and delivered in partnership with an organisation called North of England Excellence (NOEE) - www.northofenglandexcellence.co.uk.

The courses were based on real life problems such that having gathered and analysed the data (Plan, Do) they could then continue the activity within the workplace (Check, Act).

Every year we hold a Continuous Improvement Convention where a selection of teams present their "stories" to a mixed BL audience, including Directors. This serves to showcase activities, share best practice and provides recognition for colleagues.

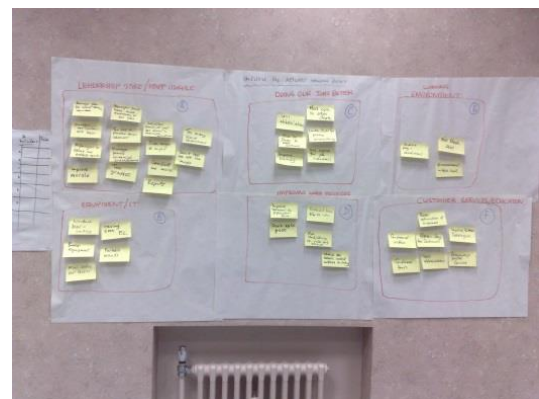


Fig 10 – An affinity diagram produced as part of a one day workshop

Summary

In summary, the steps taken on our Lean journey are as follows:-

Lean Steps	Technique
1 Performance Measurement <ul style="list-style-type: none"> Rationalised measures to “vital few” Charted key metrics and displayed in workplace 	Visual Control SPC
2 People development and Leadership <ul style="list-style-type: none"> Appoint (senior) champion Training & awareness 	Problem solving Team facilitation 5s
3 Team improvement activities <ul style="list-style-type: none"> Early success & “quick wins” Self empowered workplace team improvement 	Pilot project Quick kaizen Team based kaizen
4 Standardisation <ul style="list-style-type: none"> Layouts, procedures and work instructions 	Process mapping SOP’s
5 Resource planning & efficiency improvement <ul style="list-style-type: none"> Capacity planning – see 1 & 3 	Multi skilling Single grade
6 Recognition <ul style="list-style-type: none"> Showcasing best practice and celebrate success Senior support 	Annual convention CEO visits Tea & Bun events

The BL has so far completed c 500 team based kaizen improvement activities totalling savings in the region of £0.5m. The savings have also delivered other tangible benefits such as health and safety, environmental improvements and morale. What best describes the progress though is a quote from a member of Customer Services ..

“By only day 2 of working the new process our team's inbox was reduced from over 300 emails to 0. This was a combination of the vastly more efficient process and the increase in morale. There is nothing like seeing instant positive results to increase productivity and "get the bit between your teeth“ ...“It's easy when you're under pressure and workload is bigger than the resource to say - we haven't got the time or we can't afford to take the time out. Continuous Improvement is time consuming but within 48hours we have reaped the rewards”.