

- *TQM to Continuous Improvement to a Business Model*
- *Process improvement*
- *Focus factories*
- *Kaizen*
- *Constant change and review*
- *Turnover up 264% in 4 years*

## • History

Lakeside Engineered Systems Division is a division of the Aeroquip Group, part of the Eaton Corporation based in Clevedon, Ohio, USA. Aeroquip was founded in Jackson, Michigan, in 1940 to manufacture hose, fittings and self-sealing couplings for aircraft fluid systems. Its product line includes flexible hose, fittings and assemblies, quick disconnect and self sealing couplings, V-band and mechanical pipe couplings, hydraulic and pneumatic cylinders, ball, rotary and swivel joints, rubber joints, spring brakes, plastic molded components, refrigeration/air conditioning components and rigid pipe connections.

In April 1984, Hymatic Clamps was purchased from Flight Refuelling Group plc and, together with the Aerospace Division, re-located to the present modern premises near Birmingham in 1985. This acquisition added the capability to manufacture V-band clamps, flanges and gaskets for pneumatic systems on aircraft. The factory facility is split into five major units or Focus Factories:

- *Hose Focus Factory*
- *Clamp Focus Factory*
- *Systems Integration Business Unit*
- *Manufacturing Cell*
- *Sales and Marketing*

The organisation serves all major UK organisations in the aerospace business and, through their French and German plants, most of the major players in the European aerospace market.

## • Process Improvement

Lakeside first started its present programme of Total Quality Management in 1989 with the introduction of its MACH (Make Aeroquip Customers Happy) process. This programme had four stages:

- *MACH 1 – Training*
- *MACH 2 – Suggestion schemes*
- *MACH 3 – Measurement system*
- *MACH 4 – Team recognition*

Over the ensuing years this process served well in putting Lakeside on the path of continuous improvement. In 1993, as an extension to this process, Aeroquip adopted the use of a business model, known as AQ+, which was an adaptation of the Malcolm Baldrige award system in the USA, and in 1994, Lakeside succeeded in achieving the AQ+ award. The ensuing changes brought about by adoption of the model were initially resisted through all levels of the organisation, but once the principles of the business model for running the business were adopted and accepted throughout the organisation, change became the 'norm' throughout the organisation.

In 1995, market research showed that not only would the aerospace market grow phenomenally, but that Lakeside's market share would show a sharp increase. Meetings were held to establish how this growth would be accommodated without a significant increase in the workforce. Techniques such as brainstorming, fishbone diagrams and other conventional problem solving tools were used to fully evaluate the situation.

As a result, the change from process orientated cells to product orientated cells was selected. Previously, the organisation had been set up in the traditional fashion with functional departments headed by a departmental manager. In reviewing product lead-times, etc., it was obvious that much of the delay incurred was brought about by the need to pass responsibility for an action from one department to another, which, invariably, ended up in someone's in-tray. It was considered that if the organisation was changed to product based units, with all required functions within that unit, much of this delay would be removed. This was achieved at the end of 1995 when Focus Factories were established. The traditional functional managers became staff managers, retaining functional responsibility for the support functions particularly engineering, sales and quality. The only department to remain intact was the accounts department.

The 'big bang' approach was taken with people returning after the Christmas break to a new location within the organisation, a new line manager and new job responsibilities. Due to the previous change to the culture of the organisation, these changes were accepted with little, or no, resistance. In turn, this change led to the review of many of the established processes within the organisation. Many traditional values were questioned and radical suggestions proposed in order to bring about improvement, including:

- *Involve all levels of the organisation in the review of processes.*
- *Involve all levels of the organisation in the review of the procedures adopted.*
- *Establish cell manufacture on the shop floor.*
- *Allow each cell to design their work area.*
- *Remove any limitations regarding personnel following a project to a conclusion such as 'embarkation lines', job descriptions, etc.*

Over a year, all these suggestions, and many others, were adopted. Constant review was undertaken as to the effectiveness of these measures. A comprehensive measurement system was introduced, in order to undertake this review, covering all aspects of the organisation and involving all employees. Improvements were obvious after a relatively short space of time, particularly in the areas of on time delivery, lead time reduction, customer returns, in house defects, sales per employee, order entry lead time and response time to customer queries.

During this twelve-month period, the improvement process was extended and Kaizen workshops were introduced throughout all areas of the manufacturing functions. A more formal training plan was raised, based upon the business needs and the individuals needs and a Continuous Improvement Facilitator (Training Officer) was employed in order to facilitate this training. This position was, and still is, an hourly paid position in order to maintain the 'grass roots' affiliation to all personnel within the organisation. Improvement teams were instigated in all areas of the organisation to assess and review the methods of operation and identify areas for improvement.

As the continuous improvement programme evolved, the strategies employed on the shop floor were carried through to the administrative areas, more Kaizen workshops were implemented on the shop floor, and the training programme was enhanced.

Once again, in 1998, the organisational efficiency of the organisation was reviewed. It became apparent that, whilst the overall effectiveness of the Focus Factories was good, the work share between the Hose Focus Factory and the Systems Integration group was disproportionate. Having reviewed all options to rectify this situation it was decided to remove responsibility for sales, production control and purchasing from the Hose Factory to Systems Integration. Subsequent review of the effectiveness of this move has shown the results to be more than satisfactory.

- **Successes**

The constant review of performance over the years has highlighted many success stories. Some examples of these successes include:

	1995	1999
On time delivery	76%	96%
Lead time	16 weeks	7 weeks
Customer returns	3,800DPPM	570DPPM
In house defects	7,850DPPM	748DPPM
Customer return turn round time	27 days	2 days
Quotation lead time	14 days	24 hours
Sales/full time employee (production)	£132.2 K	£328.3 K

- **Other achievements include:**

- *Midlands Quality Award Winners – 1998*
- *ISO 9001 – Re-certified 2000*
- *nvestors in People – Re-certified 1999*
- *'CENTEC' Business Growth Award – 1997*
- *EEF Best Company Practice for the Modern Apprentice Scheme – 1998*
- *Many accolades from major customers including Short Brothers PLC, British Aerospace, Warton, Rolls Royce PLC and GKN Westland Group.*

- **Bottom Line Benefits**

The most important result to measure success is overall performance measure, which, as a result of adopting the principles of the business model and continuous process improvement across the organisation, show that:

- *In 1995 with 94 people, turnover was £5.5m, but in 1999 with 80 people, a decrease in personnel of 15%, turnover was £14.5m, an increase of 264%.*

- **The Future**

Once again the time has come for review. At the beginning of 2000 another series of off-site meetings was held in order to review the situation, using the traditional problem solving tools, with the meetings facilitated by the Continuous Improvement Facilitator.

The data used throughout the meetings included feedback from the third party customer survey undertaken by Aeroquip and the results of the Lakeside survey across the whole spectrum of the customer base. An important requirement arose resulting from these meetings and that was the need to improve the technical support to customers. It was also agreed that there was a need to retain the culture of the Focus Factories.

The subsequent outcome was to demolish all the dividing walls in the lower floor office block and re-locate all the Engineers, again under the Engineering Manager in the centre of the new office with the Clamp Focus Factory one side and the Systems Integration group the other. This allowed the flexibility within the engineering function to dedicate a number of the Engineers specifically to customer support whilst retaining the day-to-day contact with the Focus Factories.

Finally, a quote from the General Manager, Mark Day, " There are two important aspects that have significantly contributed to our success. Firstly, the management team is totally committed to driving improvements in the business, and secondly, the workforce is the best in the country. If nothing changes at Lakeside our employees become nervous; change is the only constant."