“Implementing WCM at Tooheys Brewery”
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Presentation Abstract:
Tooheys Brewery is one of the largest brewing operations in Australia, producing 300 million litres of local and licensed beer for the domestic market. With over 210 employees, the Brewery has been making beer in Sydney for over 140 years.

In 2009, following a period of significant capital expenditure, Tooheys Brewery began the systematic application of the principles of Manufacturing Excellence (MEX) to the Brewing, Packaging and Technical functions. The MEX implementation process has been structured, resourced and supported by all levels of leadership and operations within the business. Although still early in the journey, the results have been significant in terms of safety, visual improvement, performance improvement and bottom line numbers. The paper proposes to map the journey thus far, explain the principles, structure and benefits of the process used.
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Overview

Tooheys brewery is based in Lidcombe, NSW, the geographic and demographic heart of Sydney, a city of 4.6 million people. The brewery produces approximately $700 million dollars worth of domestic and internationally licensed brands annually, for the NSW and national market, through a workforce of 210 Full Time Employees (FTE’s).

The brewery has undergone a number of upgrades in both equipment and processes since it was first occupied in 1955, the most recent of which commenced in 2005 with the implementation of “Project Key”. Project Key involved the upgrade of both brewing and packaging equipment through the investment in capital of $70 million dollars.

The brewery commenced the implementation of a “Manufacturing Excellence” (MEX) program in 2009 which focused on the application of Lean Manufacturing principles through a holistic system known as “TRACC”. TRACC is an “integrated improvement system” that integrates functional and process-based best practices and develops people, transforming an organisation to achieve sustainable best practice. TRACC has been developed by Competitive Capabilities International, a global consultancy company. TRACC provides the opportunity to create a sustainable, functioning culture of Manufacturing Excellence in a 5-10 year timeframe. When compared with the duration of a self chartered journey, where success often eludes and progress at best is slow, this offers a truly unique opportunity for the Brewery to create a “World Class” operations system, where previously there was none.

There is much complexity and depth to implementing MEX and copious amounts of literature has been written on lean manufacturing and its deployment. The following paper aims to give an overview of elements of the MEX TRACC journey at Tooheys and include a brief summary of the process, its application, successes and continuing challenges for us, the Tooheys Brewery Team. It is the author’s intent to weave in some of the practical tools developed by the brewery teams and show their application in the context of lean implementation, through description and pictures.
Introduction

Whilst the implementation of equipment upgrades can achieve a step change in cost reduction, there are a number of disadvantages in focusing on this approach to maintain competitiveness: there can be difficulties in justifying and raising capital, stated efficiency gains are rarely realized in full, equipment upgrades will often deteriorate without the appropriate systems in place to fully utilise, manage, maintain and operate and competitors can equally invest in such capital equipment and thus any advantage is lost. There are other reasons, these are just a few.

To achieve sustainable improvement in competitiveness, it can be argued that a brewery must invest in both equipment improvements and also in the improvements that can be generated by a skilled, trained and motivated work force applying the principles of lean manufacturing in their day to day roles.

Lean manufacturing, as applied in such systems as the MEX process, focuses on the application of familiar lean tools such as Six Sigma and structured problem solving, and also, the embedding of the culture of continuous improvement in all aspects of the value chain. At its simplest, MEX is the ability to turn all teams into continuous improvement “engines”, working autonomously to improve the infinite complexity of the complete brewing operation. The focus of MEX is in embedding this capability in all of our people, building a self-sustaining management system and culture of continuous improvement

There have been many attempts by numerous businesses to apply change to their business: in a study highlighted in the book “Good to Great” by Jim Collins, only 11 out of 1435 organisations investigated generated sustainable performance improvements. In Lean initiatives, implementation failures occur for numerous reasons, some of which include cherry picking aspects of the lean process without full understanding of the whole process, and an inability or unwillingness to adopt a holistic approach to embed the principles of lean manufacturing, at all levels of the organization, particularly the leadership team. Often, the most challenging change is for leaders, who need to change the way they work. Typically leaders have lengthy experience underpinning their success, and changing the way they have achieved those results is difficult, sustaining those changes offers an even greater challenge.

The MEX TRACC based process provides a complete system for the implementation of Lean Manufacturing, which will be described in further detail.
The Process and Outcomes: Tooheys

The MEX process can be represented by the diagram below: the “Parthenon” model represents the interdependency between each of the key elements of a successful implementation of lean manufacturing using a familiar mental image, a building.

Figure 1: Parthenon

The interdependency of the elements are depicted such that we can see foundation stones must lay on a foundation block, and the pillars can only be laid successfully on soundly embedded foundations. This guides the builders of MEX to ensure that solid, well connected foundations and pillars must be in place, and in order, before we can claim to have built a Parthenon of MEX.

The key foundations discussed are:
1. Leading and Managing Change
2. Teamwork
3. 5S
4. Visual Management
5. Focused Improvement

Leading and Managing Change:
This is the base foundation block of the MEX process; the implementation of Lean requires that the process is effectively led and managed by the site leadership team. Simply put, without this foundation, the leadership team is unlikely to successfully support and steer a course through the challenges of implementing Manufacturing Excellence. Many sites have been subjected to lean exercises which have failed due to the inability of leadership to sustain “Leading and Manage Change” and have then been categorized as “Flavour of the Month” exercises. The practical
application of this foundation manifests in the daily, weekly and monthly meetings of the site senior leadership team. The team meets to seek greater depth of understanding of the MEX processes, review and reward the progress of various site teams and guide the site in the application and understanding of each of the foundations listed below. Commitment requires a minimum of 16 hours per month of the site senior leadership team purely focused on the implementation of MEX.

**5S:**
5S is the principle of applying disciplined thought and disciplined action to the physical layout and operation of any area of the brewery, to allow value to flow. It requires the application of “5S’s” in their chronology. Briefly these are;

1. “Sort”: the removal of unnecessary items from the workplace
2. “Shine”: the “cleaning with meaning” to both improve the appearance (and morale and ownership) of the area and allow the identification of leaks or sources of contamination
3. “Set in Order”: this is the process by which required quantities of tools and materials are placed in the most convenient and efficient location
4. Standardise: this is the application of visual, self set standards by the team to ensure standards are agreed, displayed and communicated in the area.
5. Sustain: the process of auditing against standards and subsequent “continuous improvement”

The implementation of 5S at Tooheys posed a number of challenges: the site has previously attempted hygiene exercises including cleaning days and even attempts at giving ownership to combinations of teams, team leaders and managers all at varying times and degrees of effort over the last couple of decades. These initiatives generated minimal sustainable success, and little more than a residue of their existence remained in 2009. Indeed, elements of these initiatives and others implemented in the past became known as “signs of intelligent life”. This originated from the principle that team leaders would often find dusty folders and binders with reference to cleaning systems, setup time reduction initiatives etc, which had been tried and applied in the past by leaders long gone, yet little more than these paper remnants existed as evidence of their existence.

The MEX process at Tooheys is focused on the principles of sustainability, not only in 5S but on all aspects of the implementation.

5S has been rolled out in a number of areas of the Tooheys site, including significant areas of Brewing and Packaging operations, and most recently the Technical function completed 5S throughout the whole department. 5S has been rolled out in manageable areas where an 8 week limit is put on implementations. The scope of implementation is chosen to be achievable in this timeframe. The timeframe has been chosen as it has been found to represent duration where manageable change can be achieved without becoming a “drag” on morale (which long projects tend to be).

The conclusion of all successful implementations (5S, VM, TW etc) is celebrated through a “Close Out” ceremony where all team members are invited to present to the leadership team,
followed by handshakes, informal discussion and questions and a round of pizza. A certificate is also signed by the Operations Director and hung in the main entrance of the brewery (see pictures below).

Example of a Closeout Document

Tooheys Hall of Fame: Home of the Closeouts

The following pictures and graph give some indication of the successes seen. The graph depicts an independent site hygiene audit which has shown significant improvement since the
commencement of MEX. The improvements have also been observed and quantified through the audits of insurance agencies and licensed brand owners who visit and evaluate the site on a regular basis. Their most recent observations and reports have highlighted the significant changes in performance and appearance of Tooheys Brewery.

5S is a significant focus of the Brewery. There is a firm belief in the philosophy that without the successful implementation of 5S, we will not be able to progress any other foundations or pillars of the TRACC process. 5S sustainability does (and will) remain a significant challenge in a workplace with considerable material and people movement in a 5*24 hour process with 3 shifts teams.

Graph of Improvement of Practice and Premises
Example of Team Activity Board For 5S

Packaging Maintenance Workshop Prior to 5S
Teamwork:
This element of the Parthenon focuses on the establishment of effective teamwork in the workplace. It has been shown that individuals cope with change in a more effective manner when in teams built specifically to progress the implementation of that change. Teams should have clear performance targets and be empowered with the right tools and training to achieve them.

Teamwork at Tooheys has seen the development of leadership, engineering, operations and other shift based teams, each of which have identities, visions and mottos. The teams also work toward self set goals built around PQCDMS. An example of a team board is shown below. Teams meet weekly and use these boards as a focus point for their discussions. Thus far, around 20 teams have been set up with names such as “Team Karma”, “Enginebeers”, “Hectoleaders” and the imaginatively titled “The Tooheys Leadership Team” (the author is part of this unimaginatively titled cohort and accepts there may be room for improvement).
**Visual Management:**

Visual Management is the application of two separate themes *Performance Measurement* and *Visual Display*

*Performance Measurement* is a well used and often badly applied term, in the TRACC methodology, it refers to measuring “the right things, the right way”. That is ensuring our measuring focus is on the things that will make a difference, aligned to the business plan, deployed to the appropriate level. The “right way” is about the correct visual display, using simple rules such as any visual tool should allow a seven year old to identify if the measure is on/off track in 3 seconds and whether the trend is positive or negative within 30 seconds, and be seen from 5 meters.

The progress made at Tooheys has been significant. The author will attempt to relate this to a football or cricket analogy, (though cricket not being a strong point of this Scottish author). Tooheys, prior to MEX, would display the outcome of a simple sports game as a list of corners and their times, free kicks and their offenders, referees pace of running etc. That is, long lists of factual data that would take an expert to interpret and to find the actual outcome, and leave the players (machine operators in our case) bamboozled and disengaged about daily production outcomes. Today the process has been simplified greatly to the concept of red or green, where red equals action required and green confirms performance to target.

This has been a significant improvement and, for example, allows 24 hours of running in a 3 million hectoliter brewery by 210 FTE’s, to be reviewed and actioned (with substance) in daily 15 minute meetings. The interaction with other foundations, discussed at the start of the paper, is illustrated by the use of VM in 5S, Focus Improvement and Teamwork.

Tooheys today, presents the results of the game as a simple score from which the team decides where improvements are required. In the author’s opinion cricket scores are never simple in any guise with any tools.

Some examples of visual management tools in action are shown below:
Focused Improvement:

Focused improvement is the best practice of identifying major wastes and other priority areas in order to focus all improvement activities on them. It will ensure that appropriate resources are target at the right areas to generate the maximum results. The “FI” TRACC has taken two forms, the first being “Foundational” or infrastructure of improvement and the second being specific to “FIT’s”: Focus Improvement Teams which apply improvement tools such as “DMAIC” and “5 Why”. These will be explored in greater detail below:

1. Foundational FI

Foundational FI relates to embedding the day to day and week to week infrastructure that allows operational performance review to improve it. These levels are denoted as “Tier 1”, “Tier 2” and “Tier 3” and relate to the hierarchy of importance in terms of generating value flow. Hence Tier 1, relates to shift based meetings and problem solving, T2 to department and T3 to Site leadership. The process allows the implementation of shift, daily and weekly meetings. The meetings involve the review of “PQCDSM” items i.e. Production, Quality Cost, Delivery, Safety and Morale in a 15 minute session that uses Visual Management to allow a focus on areas where deviation from target occurs. The application of this structure allows daily incremental improvements.
2. Focused Improvement Teams:
   Focus Improvement Teams act at a number of different levels applying a set of structured problem solving tools. These teams generate significant improvements (as opposed to the incremental improvements of Foundational FI) through the application of “DMAIC”:
   “Define”: clearly define the problem
   “Measure”: Measure the extent of the defined problem to establish a start point and to also allow identification of trends, reasons for issues
   “Analyse”: This is the application of “Fish Bone” analysis to identify the most significant symptoms of the problem, the use of “5 Whys” to drill down into the symptoms to determine the root cause, and the application of a prioritisation matrix to identify the easiest root causes to fix
   “Control”: the application of permanent controls and checks to ensure the actions from analyse have bedded down.

   The DMAIC process has been applied in over 40 implementations, from reducing extract loss and eliminating jams at a bottle filler, to eliminating spilled yeast in a centrifuge room (avoiding significant capital expenditure). The most powerful example to date is the reduction in safety incidents on site as a result of applying the DMAIC problem solving tool set.
**Standardised Work and Leader Standard Work**

A critical part of sustaining the processes detailed above is the implementation of “Standard Work” and “Leader Standard Work”. Standard work is shown below and is represented by a list of standard tasks required in a role to allow the flow of “value”. For a machine operator, this may be the checking of reject rates on an hourly basis, or a Brewhouse operator carrying out 5S inspections on a shift basis.

Leader Standard Work is the implementation of leadership confirmation that the standard work is functioning and effective, it translates the focus on process into daily practices and routines. It creates a structure to drive value added actions, identify and remove barriers and improve and audit processes.
In practice, Standardised work secures the gains made by Improvement Activities such as FIT’s and 5S and ensures they are sustained. Leaders standard work, ensures the application of standard work, and also provides the structure to ensure these gains are secured and improved despite personnel changes or process changes.

The process provides the tool to prevent the previously describes “signs of intelligent life” scenario. The outcomes of improvement processes must generate standard work which enters the “running the business” structures (such as T1, T2, T3 daily meetings) to embed the gains and ensure they are sustained. This is achieved by applying the principle of PDCA, “Plan Do Check Act”, a constant cycle of improvement and locking in gains by applying standard operating procedures, standard work and leader standard work.

Much more could be written and much more has still to be learned by the author about a practice that appears easy to grasp yet proves illusive in its consistent application. The diagrams below attempt to show the relationships and the practical outcome.
Continuing Challenges and Opportunities

The ongoing challenges are:

1. Continue the roll out of the foundations of the MEX process. That is, Leading and Managing Change, 5S, Teamwork, Visual Management and Focused Improvement, to cover further geographical areas and departments.
2. Maintain and improving standards in completed implementations and ensuring their sustainability (and that of the MEX process).
3. Begin the pilot implementation of the Pillars. That is, Autonomous Maintenance, Asset Care, Setup Time Reduction and Quality. As with the implementation of the foundations, the challenge is to select the correct areas for Pilot implementations, areas that will both deliver performance improvement and contain the elements of a successful and influential implementation: skill levels in place, correct levels of motivation and business leaders.

Conclusion

Tooheys has taken significant steps in implementing the foundations required to build the Parthenon of lean, achieving significant results in terms of performance and practices. The author has only touched on the challenges and successes that have been experienced in progressing the MEX journey over the last 3 years: as stated in the introduction, the brewery, as with most manufacturing facilities, has infinite complexity and when coupled with the nuances of human nature, it can be seen that the implementation of MEX is truly a significant undertaking. This year (2012) offers a huge challenge, with the planned implementation of over 120 activities compared with 47 in 2011. Yet this presents the opportunity and attraction of applying the MEX process: the more implementations we do, the more value we add to our brewery and the more we learn. In addition our roles become more meaningful; it is the elimination of waste that drives the heart of the process, not only in dollar terms, but principally the elimination of waste in the application of human endeavor.