

Meat technology update

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Think lean: Improving productivity

- Adoption of 'lean thinking' and manufacturing by the automotive industry has had dramatic effects—cuts of: 50% in variable costs; 90% in defects; and 75% in inventory.
- The National Foods facility at Morwell, Victoria has greatly improved operational efficiency and adherence to weekly operation plans, and dramatically reduced injury lost time, sick leave and physical waste.
- Lean thinking is being implemented in several Australian meat-processing companies.
- This MTU describes the principles of lean thinking and manufacturing, and provides some case studies.

Drivers and opportunities for the red meat industry

In order to maintain Australia's meat industry leadership position in the global marketplace, we must continually meet, or exceed, our customers' requests in terms of quality, delivery performance and cost—compared with our international competitors. This is becoming increasingly difficult without an increase in our levels of performance. Our competitors are striving to match Australia's performance so the Australian industry must improve further.

The pressures for change are also being driven by rapidly changing expectations from consumers around the world. Our international consumer markets are requiring that all suppliers meet increasing standards of quality and delivery at competitively managed costs. Failure to respond to these pressures may prevent the Australian meat industry from remaining internationally competitive.

Evidence from the automotive industry has shown that lean thinking has delivered a 50% cut in variable costs of production, a 90% reduction in defects and a 75% reduction in inventory. Similar results have been achieved in many manufacturing industries. According to MLA Report SCB.023, a result of this magnitude in the meat industry is possible and would dramatically improve the Australian industry's competitiveness.

This Meat Technology Update discusses some of the many tools available in this area of productivity improvement and cultural change, that may be relevant to the meat industry.

Lean thinking is all about getting the right things to the right place—at the right time and in the right quantity—while minimising waste and being flexible and open to change.

Lean thinking and lean manufacture

Lean thinking is a management philosophy focusing on the reduction of seven wastes to improve overall customer value:

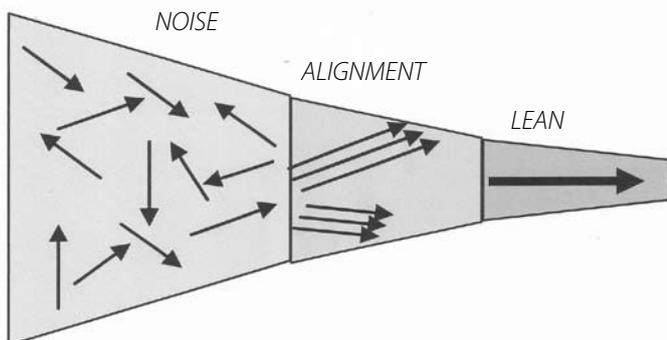
- Transportation
- Inventory
- Motion
- Waiting time
- Over-production
- Processing itself
- Defective product (scrap or rework).

Lean manufacturing comprises the operational activities that result from the application of 'lean thinking'. By eliminating waste, quality is improved and production time and costs are reduced. Lean manufacturing is not just aimed at the process line; it is aimed at the elimination of waste in every area of manufacturing including customer relations, product design, supplier networks and plant management. The goal is to use less human effort, less inventory, less time to develop and produce products, and less space—to become highly responsive to customer demand while producing top quality products in the most efficient and economical manner possible.

It is most important that all of these concepts be understood, appreciated, and embraced by the actual employees who produce the products and, in so doing, define their own processes. The cultural aspect of lean manufacturing is just as important as the actual tools or methodologies.



The move from a 'noisy' present to a 'lean' future can be shown in the following diagram.



Conflicting priorities
High variability
Resolved by:
Common solutions
Low sophistication
Groundwork
Foundation laying

Doing
'core things'
well and in the
same way

Application of
science
Continuous
improvement of
'core things'

The philosophies and principles used here are not new fads, but are simple principles and practices of good business management. Like all aspects of work-place cultural change, they do not, however, come easily. To fully utilise these principles and achieve the substantial benefits that they offer, a significant change in mind-set is required at all levels of management.

Value chains

For lean thinking, the term 'value chain' is used rather than the more familiar 'supply chain' because we need to focus on the value provided by each step in the chain. If a step in the supply chain as we know it does not add value, then the step can be considered a waste and we need to seek ways to reduce and ultimately eliminate it. Transportation between some sites can be seen as adding little or no value. The chain from raising an animal on a farm to providing meat on a plate is well recognised. How much, though, are customers prepared to pay for value added at each stage? If there is no obvious added value and they are not prepared to pay, or if the activity costs more than the value added, then this is a waste and a solution is needed.

Value chain mapping

Value chain mapping (sometimes known as value stream mapping) is a paper and pencil tool that helps you to see and understand the flow of material and information as a product or service makes its way through the value chain. Value chain mapping typically gathers and displays a broader range of information than a typical process map or flowchart, and over a bigger scope i.e. from receipt of raw material to delivery of finished goods or, in the meat industry, from paddock to plate.

Value chain mapping is used to identify where to focus future activities for improving the 'leanness' of part, or all, of the operation. It takes into account not just the process itself, but also the management and information systems that support the basic process. This is especially helpful when working to reduce production cycle time, because an insight can be gained into the decision-making flow in addition to the process flow.

The basic approach is to first draw a process flow diagram; then, over it, map the information flow that enables the process to occur. To ensure

that the mapping process and the subsequent implementation process are effective, it is important to keep to the following principles:

- the customer defines value—no one else;
- adopt a 'value chain' mind-set;
- work in partnership along the chain by creating partner relationships with suppliers and customers. Remember though that supplier/customer relationships exist within an establishment and should be developed;
- implement operational procedures, work methods, work skills and mind-sets which act to eliminate all forms of waste and variance such as:
 - over-production—excess and premature production. e.g. unsold stock in a cold store;
 - over-processing—waste in processing; poor process design. e.g. over trimming of carcasses with loss in yield;
 - stock—partially completed work or materials not yet needed in production. e.g. overstock of packaging materials on site;
 - motion—activity (by people) that does not add value to the product. e.g. continuous chain where carcasses and operators move, versus shuttle chain where only carcasses move;
 - defects—production items that are scrapped or reworked, e.g. dropped meat that requires reprocessing or scrapping;
- strive for a workflow that is 'pulled' along the supply chain by the customer;
- continuously strive for perfection;
- put people first by providing them with the resources, skills and accountability to enable them to manage their own process accurately;
- base decisions on real data obtained from the process floor.

Stages in value chain mapping

1. Commit to the lean thinking process.
2. Select a value chain to be studied.
3. Draw the current state map.
4. Develop a future state map.
5. Develop an action plan.
6. Commit the necessary resources and implement the plan.

The MLA report on Project SCB.023, 'Value chain mapping', includes an example of typical activities at each stage.

Identifying a supply chain for value mapping

The value chain mapping process between process areas within one company is a much less complicated exercise than an exercise that encompasses several supplying companies that are linked in a chain to customers. The Australian meat industry has already built strong supply chain relationships. These budding partnerships will play an important role in establishing the required trust and removal of commercial sensitivity that will be essential in securing long-term success for all links in the paddock-to-plate value chain.

Products with similar attributes, routes through the supply chain and customers are grouped together to form product 'families'. The family that will have the greatest impact on customer requirements and financial return should be the first one chosen for mapping.

Choosing an in-house value chain that can easily be shown to be improved will ensure a successful outcome that will build on the value chain mapping team's expertise and confidence and the lean thinking culture within the organisation.

Establishing and measuring suitable KPIs

Seven key performance indicators (KPIs) were originally developed for the automotive industry, but have been used and adapted for a wide range of industries as generic measures. They can be used as benchmarks against best practice, and also provide the basis for continuous improvement initiatives.

The following KPIs are the primary drivers for optimising business performance in quality, cost and delivery.

- **Right first time**—a measure of the product's ability to match customer's specifications.
- **Delivery on time and in full**—a measure of how well the supplier matches planned delivery requirements of customers.
- **Stock turns**—a measure of how frequently the raw material, work in progress or finished product are turned over in relation to sales revenue.
- **Overall equipment effectiveness**—a measure of output effectiveness of a process, relative to the availability, performance and quality of that process.
- **Value added per person**—a financial measure that relates the number of direct labour units involved in the process, to the value added to the product.
- **People productivity**—a measure of operator hours required to produce a specified number of units.
- **Floor space utilisation**—a measure of sales revenue generated per unit area of plant floor space.

It is important to determine which KPIs have most relevance to the value chain that is being mapped. While all KPIs will have some relevance, only a few may be required to measure improvements in performance of a specific process.

In developing and implementing lean manufacturing, there are a number of philosophies and methods that can be used. Lean thinking teams should develop a 'tool kit' of these tools, one of which is 'Five S' (5S). 5S consists of five activities to optimise workplace performance.

These are:

- Sort
- Set in Order
- Shine
- Standardise
- Sustain.

There are other techniques that can be used to streamline the lean manufacturing process. Some of these techniques are:

- **Takt Time:** This works backwards through a process system, looking at the time it takes to do each step within the process. The aim is to synchronise output with customer demand;
- **Kaizen:** Kaizen is a Japanese word meaning 'improvement'. It can be applied as a continuous process because small, stepwise improvements over a long period, build up to an overall large improvement. Or, it can be applied as a 'Kaizen Blitz', where there is an intense focus on a particular area for a short period of time, leading to a big improvement at that point;
- **Kanban:** This is a simple scheduling system, which involves communication between different groups. In essence it is stock control—the aim is to keep product moving from producer through warehousing to customer without having bottlenecks or overstocks.

More information on these and other lean manufacturing techniques can be found in the resources section at www.strategosinc.com.

When implementing a lean manufacturing system, it is important to fully document the process to maintain consistency and transparency. The plant QA manuals and work instructions provide a good framework for this documentation.

Applying the principles of value chain mapping

National Foods—Morwell case study

National Foods at Morwell is one of 18 National Foods manufacturing plants, and operates 24 hours a day, 7 days a week with just under 200 employees. The Company took on an improvement project in 2004 with the objective of improving the overall performance of the site using improvement methods based on lean thinking principles.

Challenges facing the Company at the time included:

- ageing workforce with limited food industry experience;
- shift structure that made communication difficult;
- culture of resistance to change and 'just get the thing running';
- new management team;
- high levels of capital investment consuming resources.

The site first standardised work practices as a basis for improvement. Close monitoring and daily review of safety, downtime, quality and waste were carried out with the root cause of problems always the focus for improvement. Performance was assessed on daily, weekly and monthly bases and allowed for small incremental improvements to amass into a significant cultural and work practice change. Key areas of management focus were:

- organisation—leaner, simpler management structure;
- transfer and sharing of knowledge;
- visual feedback on performance;
- production planning;
- communication.

National Foods also included other lean tools including 5S workplace organisation, operator maintenance, production levelling and product & equipment rationalisation. As a result of the 'Lean Principles' driven improvements, National Foods Morwell has, in 2 years, seen:

- lost time injury frequency rate down by 53%;
- medically treated injury frequency rate down by 52%;
- reduction in physical waste by \$20/tonne of product;
- improvement in operational efficiency by 55% (the ratio of value added time to total line time increased from 38% to 59%);
- weekly production plan achieved 95% of time (previously 25% of time);
- 12% reduction in man hours;
- sick leave reduced from 9% to 4%;
- delayed capital investment on capacity to meet demand.

CRF (Colac Otway) — 'work in progress' case study

CRF's lamb processing facility in Victoria has commenced the implementation of a lean thinking strategy. The management structure for the implementation of the program has been developed and the company is focusing on extensive training for employees in the philosophy behind the strategy. CRF sees lean thinking as a 'whole company' program and plans to focus on improving flow and removing waste through tools such as value stream mapping and 5S.

The Company plans to use lean manufacturing principles aligned with their Culture Change program which commenced in 2005, and will be benchmarked in July 2007. There is an opportunity to link lean principles with the

'constructive' culture which the company is aiming for. The two philosophies are very complementary and will drive change within CRF. As part of the Culture Change program, views of the workplace culture at CRF have been sought from every employee. Senior management and all managers have also been assessed by their peers, as to their work style and individual impact on the culture.

CRF's Lean Manufacturing program is in its very early stages; however, projects to generate incremental change have already produced noticeable results in the skin-grading area and in the offal-processing and packing area. These projects have reduced wastage and created efficiencies in the process. The management at CRF believes that these improvements are just a small indication of what will be achieved over the next 5 years.

Further reading

Value Chain Mapping – MLA Project No SCB.023 – Meat & Livestock Australia Ltd, 2005.

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Hirano, H. and Furuya, M. (2006), *JIT Is Flow: Practice and Principles of Lean Manufacturing*, PCS, Inc., ISBN 0-9712436-1-1

Poppendieck, M., *Principles of Lean Thinking*, Poppendieck.LLC USA.

The information contained herein is an outline only and should not be relied upon in place of professional advice on any specific matter.

Contact us for additional information

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