



LEAN THINKING

Proven compatibility

Preston W Blevins discusses the compatibility of Hazard Analysis and Critical Control Point – a proven food safety methodology – with Lean Thinking

This discussion focuses on the compatibility of Hazard Analysis and Critical Control Point (HACCP), a proven food safety methodology, with Lean Thinking. It will provide guidance on how to leverage the investment in HACCP by utilising one of the most powerful analysis tools in the Lean Thinking toolkit to create operational excellence and competitive advantage.

Food safety

Food safety is a concern in every country that has large urban centres and mass-produces food. The development of very rapid distribution systems has amplified the impact of contaminated food entering the food supply-chain. A respected publication recently documented the consequences of contaminated food in the USA:

“The Centers for Disease Control and Prevention estimate that our food supply now sickens 76 million Americans every year,

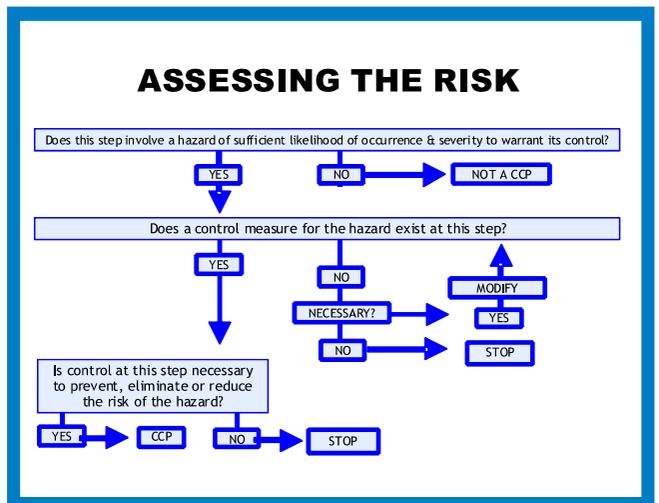
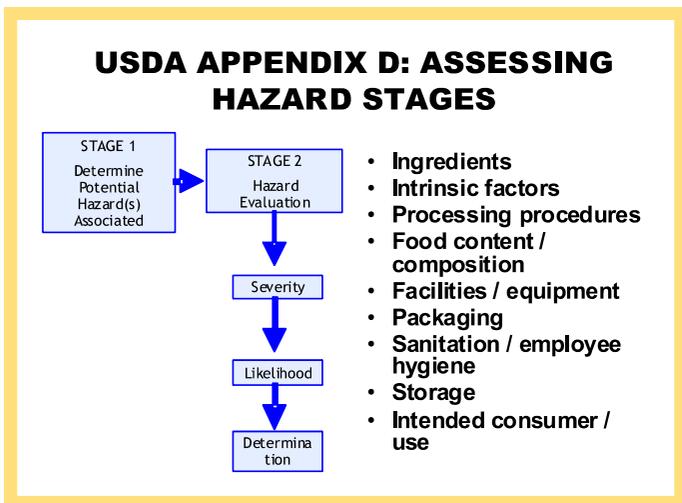
putting more than 300,000 of them in the hospital and killing 5,000.”

It is reasonable to believe that this level of damage to the health of citizens is occurring in every country in the world that has urban centres. Not all countries have mechanisms in place to quickly gather this type of information and estimate the consequences of corrupted food so the degree of damage is often obscured.

The statistics cited above are the result of unintentional breakdowns in manufacturing process management and quality control. However, another food safety concern has developed intentional attacks on our food supply-chains and acts of terrorism. Many countries have experienced acts of terrorism recently, including India. Up to this point, none has been directed toward food supply-chains.

HACCP and cGMP

The response to this situation has been the





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accelerated adoption of a food safety methodology developed thirty years ago. This methodology is Hazard Analysis and Critical Control Point (HACCP). HACCP focuses on identifying and preventing hazards that could cause food-borne illnesses rather than relying on spot checks of manufacturing processes and random sampling, it:

- Focuses on identifying and preventing hazards from contaminating food
- Is based on sound science
- Permits more efficient and effective government oversight, primarily because the recordkeeping enables investigators to see how well a firm is complying with food safety laws over a time period rather than how well it is doing on any given day
- Places responsibility for ensuring food safety appropriately on the food manufacturer or distributor
- Helps food companies compete more effectively in the world market
- Reduces barriers to international trade
- Eliminates or minimises the probability of product recalls.

HACCP is in essence a tool to analyse manufacturing processes while applying science to the behavior of the food being processed. Illustrations one and two below graphically depict the analysis scheme.

There is an HACCP prerequisite, current Good Manufacturing Practice (cGMP). It addresses operational conditions and provides consistency, creating the foundation for the HACCP system. cGMP includes process documentation, quality assurance, machinery and facilities maintenance procedures and worker qualification orientation.

Another observation on HACCP, I setup daily web searches on key words that relate to food safety such as HACCP. When the results started to come in, it soon became obvious that food and beverage manufacturers around the world view HACCP as having a dual purpose, food safety *and* marketing. The statement 'produced under HACCP controls' brings significant marketplace advantage, particularly to food and beverage contract manufacturers. Additionally, the importance of HACCP is reflected in the development of ISO 22000.

Lean Thinking – Value Stream Mapping

Peeling back the rationale behind HACCP layer by layer, it is very similar to

• The Pareto rule

The 80/20 rule-percent 80 of value is stored in 20 per cent of the items and activities.

HACCP requires identification of the critical points of exposure, the 'A' items and putting in place effective safeguards for them.

• Theory of Constraints (TOC)

TOC focuses on identification of major bottlenecks in product flow through manufacturing (or any process flow), optimising the output from the constraint/bottleneck and eventual elimination of the constraint if possible.

HACCP is directed toward identification of major points of vulnerability, optimising to eliminate or minimise them.

• Value Stream Mapping (Lean Thinking)

This technique analyses each step in a process to determine how much waste is present in that step and the others up and down stream

VALUE-STREAM MAPPING

<p>Simple .. No equipment needed</p> <p>See and understand</p> <p>Flow</p> <p>Activity + information</p> <p>Eliminate waste</p>	<p>Value Stream Mapping - 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 stream.</p> <p>Value stream map (AKA end-to-end system map) takes into account not only the activity of the product, but the management and information systems that support the basic process. This is especially helpful when working to reduce cycle time, because you gain insight into the decision making flow in addition to the process flow. It is actually a Lean tool.</p> <p>Source: iSixSigma</p>
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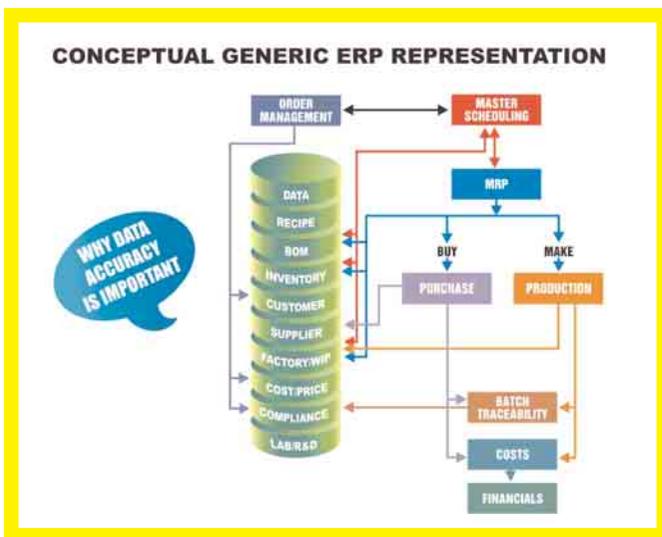
ENTERPRISE RESOURCE PLANNING (ERP)

<p>Framework</p> <p>Organizing business processes</p> <p>Integrated</p> <p>Single unified database</p> <p>Effectively plan & control</p> <p>Seek external advantage</p>	<p>Enterprise Resource Planning (ERP) – Framework for organizing, defining, and standardizing the business processes necessary to effectively plan and control an organization so the organization can use its internal knowledge to seek external advantage.</p> <p>Source: APICS Dictionary, Eleventh Edition</p> <p>Enterprise Resource Planning systems (ERPs) integrate all data and processes of an organization into a single unified system. A typical ERP system will use multiple components of computer software and hardware to achieve the integration. A key ingredient of most ERP systems is the use of a single, unified database to store data for the various system modules.</p> <p>Source: Wikipedia, the free encyclopedia</p>
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from it. Additionally, the information system, manual or automated supporting the process step, is documented. Waste is defined as the time a product sits without value being added, unnecessary handling and so forth. Value Stream Mapping is intended to identify and eliminate waste; HACCP identifies and eliminates vulnerabilities. A definition of Value Stream Mapping is contained in illustration three below.



About the author

Preston W Blevins is a Director with BatchMaster Software and has had extensive international experience. He specialises in the implementation of good business practices for enterprise resource management, Lean Thinking, supply-chain management and e-collaboration. Preston's hands-on, practitioner manufacturing industry experience spans 12 years. He has held all positions associated with materials, manufacturing and plant management in a variety of manufacturing environments, and has spent the last 25 years in the consulting and the manufacturing software industry. He has had extensive involvement with APICS and has held many key management offices. His certifications by APICS include CFPIIM, CIRM and CSCP. Preston is also certified as a fellow by BPICS (now the Institute of Operational Management) and as an Organisational Engineer (Salton-MSU). He has been a frequent speaker at major professional society conferences and has published over 25 white papers. He can be reached at pblevins@batchmaster.com

Value Stream Mapping is the point at which we introduce Lean Thinking and how to leverage the investment in HACCP plans and cGMP into our discussion. The existing analysis of process flows can now be revisited using this technique. A definition for Value Stream Mapping is given in illustration three below.

The key phase in this definition is 'eliminate waste'. An alternative way of expressing this is eliminate 'non-value added' activity. The definitions for non-valued added and value added activities follow.

• Non-value added

Any activity that does not add market form or function or is not necessary. These activities should be eliminated, simplified, reduced or integrated.

• Value-added

Any activity that increases the market form or function of the product or service. These are things the customer is willing to pay for.

Now that we know what Value Stream Mapping is, what are the benefits beyond the somewhat simplified statement of identifying and eliminating waste? A short list is provided as follows:

- Helps you visualise more than a single-process level. You can only improve what you can see and understand
- Links the material and information flows, industrial engineering and Information Technology (IT) are integrated and documented
- Provides a common language to describe opportunities for improvement, lean techniques are taught at universities and are pervasive
- More useful than quantitative tools, time tested and easily understood by manufacturing practitioners
- Provides a blueprint for implementation of improvements to eliminate non-value adding activities using proven concepts, techniques and procedures.

After Value Stream Mapping – What Next?

After the Value Stream Mapping is completed, it provides a focus and springboard



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for eliminating waste on a continuous basis (aka continuous improvement) using the following Lean techniques and concepts:

- One piece flow • Cellular • Talk time
- Pull/Kanban • POU • Quick changeover
- Quality at source • Batch reduction
- Teams • Standardised work • Workplace organisation • Visual communication
- Plant layout.

Instructions on the use of each of these techniques and concepts are readily available through universities, professional societies and consultancies. Note: The outcome of eliminating waste may require revisiting and revising your HACCP controls.

The missing link

There is a missing link to achieving competitive advantage that we have not yet discussed. With HACCP and Lean manufacturing, we can manufacture safe food efficiently but still can make 'The wrong product, at the wrong time in the wrong quantities.' There is a need for a rational way of managing inventory, sequencing/scheduling production activities and recording regulatory compliance information on a cost effective basis. There is also need for integration of all business processes starting with quotations for new customer business through to collection of money for goods delivered. The only proven mechanism to achieve this is the time tested integrated best practice business model called Enterprise Resource Planning (ERP). For a definition of ERP see illustration four and a simplified schematic in illustration five.

What came first, the chicken or the egg?

We have discussed three different concepts and methodologies, HACCP-cGMP, Lean Thinking and ERP that are compatible and when used in combination with each other amplify and enhance each other to produce very positive results. The question often asked by food manufacturers who do not these three in place is 'what should be our first priority?'

Without question, food safety HACCP is the number one priority!

The next priority is implementing ERP. It

About BatchMaster Software

BatchMaster Software, Inc has provided advanced ERP solutions for over two decades with more than one thousand five hundred installations worldwide. Batch Master's customers can be found in every formula or recipe-based business, including food, beverage, cosmetic, personal care, paint and more. FBatchMaster has more than a hundred technical staff members of highly qualified software professionals. Visit <http://www.batchmaster.com/index.htm> and <http://www.batchmaster.co.in/> for more details

provides support for the other food safety requirements such as lot number record keeping, transactional history, data validation to ensure accuracy, delivery of work instructions at the points of use (Standard Operating Procedures – cGMP), lot recall support and of course HACCP in the areas of plan publication, scheduling tests and housing test results. ERP puts in place a rational framework that not only supports food safety but also provides the stability that is needed to leverage Lean Thinking and preserve the processes that have been revised to eliminate waste. A final thought on the priority of what is implemented first, each system does not need to be implemented on a sequential basis. Selectively implementing the ERP sub-systems needed to support food safety while analysing processes to develop HACCP plans does make sense. The key is to be pragmatic and realistic in creating the overall company implementation plan.

Conclusion

This discussion provided guidance to the progressive food and beverage manufacturing industry executive on 'how to' leverage the proven food safety methodology HACCP, along with an important tool in the Lean Thinking crusade, Value Stream Mapping and the best business practices model of ERP into significant operational improvements. Operational improvements that will make a positive impact on bottom line profitability. The time for action is now, it is your money! 🍒