01

Life Cycle Management: from product to business

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01\ A schematic breakdown of Formway's life chair shows the materials used.

This is the second in a series of three articles on Life Cycle Thinking and its application to design-led business practice. The articles and the aligned series of workshops at the Unitec School of Design in Auckland are designed to equip people with the capability to promote principles of Life Cycle Thinking and to initiate change within their organisations.

A practical framework

While Life Cycle Thinking enables a migration of thinking from an object to a product system, Life Cycle Management (LCM) moves you from a product view to an enterprise view. In effect, it can sharpen your organisation's focus on delivering sustainable products and services.

LCM is a practical approach which focuses on the application of Life Cycle Thinking through the use of life cycle tools and approaches. LCM has been defined as an integrated framework of concepts, techniques and procedures to address environmental, economic, technological and social aspects of products and organisations. Continuous environmental improvement is the key tenet, from a life cycle perspective.

LCM provides the link between theory and practice. Its greatest advantage is the ability to identify and account for the trade-off between environmental impacts occurring at different locations, times and life cycle stages. This is done without losing sight of business constraints and the functionality to be delivered to the end-user.

It is important to understand that LCM, as an approach, is scalable so can be applied within small business and is not restricted to large enterprise. Critically, LCM is being adopted by leading industries to 'operationalise' their environmental management strategies and practice.

LCM at Formway

Formway is a design-led New Zealand company that has adopted a holistic approach to sustainability within its business. Six discrete areas have been defined in the company's sustainability programme. These areas follow the main stages of the product life cycle:

1. Sustainable Product Design.
2. Supply Chain Management.
3. Environmental Management Systems (EMS).
4. Product Stewardship (addressing end of life issues).
5. Climate Change.
6. Stakeholder Communications.

The first four areas follow the main stages of the product life cycle, whilst the last two areas – Climate Change and Stakeholder Communications – receive specific attention as both are deemed essential to the continuation of success that the company currently enjoys with its products. Formway uses four key instruments (approaches) to deliver integrated Life Cycle Management:

1. Life Cycle Assessment (LCA) studies to inform company strategy and product development.
2. Environmental Management Systems according to the ISO 14001 standard.
3. Supplier Environmental Requirements and initiation of specific supply chain collaboration projects.
4. Eco-labelling: used to verify product and production environmental performance, based on Life Cycle Thinking.

The Formway Life chair and a number of other products and materials have been analysed from a life cycle environmental perspective (and the results peer reviewed). Analysis results for the Life chair, illustrated here using CO_2 impacts, show three major findings:

1. The majority of the Life chair's climate change impact is due to CO_2 emissions occuring during raw materials extraction and component processing.
2. Final product assembly and

transport stages make a relatively small contribution to the climate change impact.
3. Recycling the chair gives an overall reduction in the climate change impact even when taking into account transportation and reprocessing energy.

Using these LCA results as a source of innovation, the company has been able to make more informed design choices in subsequent product development projects. They have also been instrumental in stimulating the company to initiate a 'Product Stewardship' project to enable improved environmental performance at end-of-life. This product stewardship programme injects a service based component over the life of the product and offers some interesting potential for re-engagement with consumers at different touch points along the product life span.

Toolbox and standards

As the Formway example shows, LCM is realised within an organisation by applying an appropriate suite of tools. A crucial prerequisite to its successful application is an organisational culture which enables, fosters and maintains focus on sustainable action and dialogue with all relevant stakeholders.

A wide range of established tools approaches and international standards exist, each having different application areas and benefits.

The most well known system is the ISO 14001: Environmental Management System (EMS). Often EMS approaches are used to address operations or site specific issues. ISO 14001 does operate effectively within New Zealand and there are established auditors such as Telarc.

Another design-led company, Design Mobel built on an existing ISO 9000 quality system to move into ISO 14001. This defined the operational impacts and established a set of objectives and targets which would address these issues over a period of time (including all facets of the business). In this instance, an internal team worked with an external ecologist who advised on the best process to work through and it resulted in internal staff presentations to all levels about the outcomes of this research.

A New Zealand developed EMS is Enviro-Mark NZ. One of the attractive things to an SME is the lower entry level and cost. It enables a company to start the process of adoption and build up to the level of ISO 14001.This approach breaks ISO 14001 requirements into five audited sub-steps, to enable a phased EMS implementation. This method is delivered and audited by Landcare Research.

Fusing with science

Formway and Design Mobel both exemplify the fact that SMEs in New Zealand can adopt an LCM approach and apply new tools and approaches to put some rubber on the road. It has directly enabled Formway to make effective decisions about the life cycle of products simply because of a more in-depth understanding.

Life Cycle Management can be a daunting endeavour as it can move business owners and executives into areas where they have little expertise or experience. This can be overcome by taking small steps and making an enterprise level commitment to the integration of Life Cycle Thinking. Company strategy, actions and improvements will follow this commitment.

There are huge opportunities for New Zealand designers to demonstrate leadership by creating credible and inspiring solutions of tomorrow today. So get started.

The third, concluding article in this series will provide an overview of specific life cycle tools and approaches, including approaches to sustainable ideation and life cycle tools suited to more analytical stages of the product development process.

Further case studies

The LCA Center Denmark has a website giving examples of companies that have implemented Life Cycle Thinking. These include Electrolux, Grundfos, Novozymes, Philips, Rockwool and Vestas: *www.lca-center.dk/cms/site.aspx?p=4015*

Patagonia is an example of total supply chain and material understanding which leads to a product leadership position. Take a look at the footprint chronicles which explain impacts of the product and supply chain: *www.patagonia.com/web/us/footprint/index.jsp*

Ford Motor Company has developed a life cycle sustainability approach to product development. The Product Sustainability Index is one design and communication tool developed in-house: *www.ford.com/aboutford/microsites/sustainability-report-2006-07/documents/ford-psi.pdf* .

The United Nations Environment Program SETAC Life Cycle Initiative is a global programme which specifically aims to bring science-based life cycle approaches into practice worldwide: *www.unep.fr/scp/lifecycle/management*

To learn more about sustainable product design processes, check out the remaining two of three half-day workshops on Life Cycle Thinking (details opposite) at Unitec in Auckland on the following dates:

July 3: Life Cycle Management
August 7: Life Cycle Tools

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