

ECI Lean Construction Task Force Report

Initial Report - July 2011

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Task force Report***

- Initial Report

July 2011

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Foreword

Key Thoughts from Members 5 Months after Launch

"Lean isn't only tools or only elimination of waste... Lean is a way of thinking, philosophy and culture change by which continuous improvement will become a habit / a part of your life / a way you work."

Sabine Verdickt - Project Engineer, DuPont

".....if the industry is going to change it has to be a coordinated, continual and determined effort. Therefore this must be driven by the first tier suppliers through collaborating with their supply chains and forcing it to filter down..... for this to happen it must be pushed from top levels of management within each company."

Ben Charles - KTP Associate, Continuous Improvement Engineer, Laker Vent Engineering Limited

"Lean is not only for manufacturing, it can be adapted to our service / project activity. There is no one technique for being Lean, it is a mindset supported by a catalogue of techniques."

Arnaud Lemaitre – Veolia Water

"..... there are a number of like minded people who recognise that there is a prize to be gained to unlock the potential through lean construction, but we need to help each other to fully understand how to do this."

Nigel Barnes - Managing Director, WSP CEL Limited

"The thing that stands out to me is the "buy-in" from the different organisations and individuals within the Lean Task Force. We have involvement from client, design & management and contractor organisations giving us a good representation of our industry - this has led to a confidence that Lean can be applied throughout the industry."

Tom Ventre - Project Manager, Laker Vent Engineering

"I've gained a greater understanding of Lean principles and in so doing have greater confidence that Lean can be applied as effectively in a project and service environment as it has been in the manufacturing industry."

Chris Brumby - Project / Construction Manager, AstraZeneca

"The concept of Lean is wholly transferrable to the engineering construction industry and cannot be dismissed as something suited only for the manufacturing industry.....it's more about buying in to the philosophy of continuous improvement rather than merely applying a suite of tools"

Chris Mann - Head of Research & Development: Skills & Technical, Engineering Construction Industry Training Board

"The rewarding thing from my perspective has been to see the growing understanding of Lean as a changed mind set rather than the simple application of a set of tools. There is a clear appetite for the change required and an acceptance of the need for a continual search for improvement as opposed to a quick fix."

Christine Pasquire, Professor of Lean Project Management, Nottingham Trent University & Director / Trustee of the Lean Construction Institute UK Ltd

Acknowledgements

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Executive summary

From ECI members we have heard several times “Why Lean in construction?”, “How do we start with Lean in construction?”...

As a Task Force we have done several activities to see what knowledge we have about lean and better understand for ourselves what lean is. One of the activities has been a Study Action Team that read the book *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer* by Jeffrey K Liker (2004)

This document is an **initial report** developed by the ECI Lean Construction Task Force Team which gives our answers to the first question and presents learning. We have short listed answers to: Why Lean? What Lean is / isn't, Dos and don'ts. Furthermore several examples of waste in context are given. In addition to our learning so far we have described the strong links with other ECI Task Forces, Active, Collaboration, People, SHE and Young People.

The main conclusion is that Lean can be used in Construction. It's more than only tools it's a way of thinking and working. And yes, we have to do this if we want to excel in what we do over the long term. You can even start today.

In the next report we will go further on how to start with Lean in construction with suggestions on how to find your way through all the information that's available.

1. Introduction

1.1 Lean Construction Task Force

Members

Member companies involved with this task force are: AMEC, AstraZeneca, BG Group, CB&I, Du Pont, ECITB, Fluor, Kingsfield Consulting International, Lean Construction Institute (UK), Loughborough University, Nottingham Trent University, Laker Vent Engineering, Sellafield, Veolia Water, WSP CEL.

Objective

The aim of the ECI Lean Task Force is to learn more about lean in construction and gather more data on specific lean tools and how lean can be smoothly implemented with the greatest reward. This knowledge is to be captured in ECI Lean TF guides and in workshops. Also the experiences of Taskforce members on their 'lean journey' will be shared to provide learning points for other members and to see the benefits. This will be achieved through gathering a case-book of lean experiences. Furthermore the aim is to provide members with the means to promote Lean within their own organisations, within ECI and within the European Engineering Construction Industry.

1.2 What has the Task Force done till now?

The Lean Task Force started November 2010. The activities of the TF have been first of all to understand what lean is. This has been accomplished by a Study action team that read the book *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer* by Jeffrey K. Liker (2004). Furthermore several Lean tools have been explained to the TF team members. All this has lead to a summary of our key learning and focus relevant to the Lean TF. A first part of our key learning has been reported during the Conference April 14th 2011 and compiled in this report: Why lean?, What lean is / isn't, Dos and don'ts.

What Is a Study-Action Team ?¹

A Study-Action Team™ (SAT) is an unconventional approach to creating the openness, tolerance for disagreement, and trust needed to confront the real issues that arise on the path to change. The members of an SAT perform a series of activities to fulfil their commitment to bring about the new ways of thinking and acting that must occur for change to become a reality in an organization. First, they set a goal, select a book, and read and discuss it together in a structured way. Secondly, they participate in a planning session, applying the ideas gleaned from the book to their current work situation. Finally, they implement the plan, holding themselves accountable to a committed leader, monitoring progress and making adjustments as they go along.

Study-Action Team reading the book *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer* by Liker, Jeffrey K (2004)

The goal of SAT: to understand where to focus our effort for the ECI Lean Task Force.

The benefit of reading a book in a study action team is to keep reading the book in a short and dynamic way. It's more intense and absorbing due to the discussions with several people who go through the same stages during the reading. Each of the sessions enabled us to consider our understanding of Lean and it's applicability in a Construction Environment. Furthermore this book is an excellent introduction to Lean for a general audience that explains the management principles and business philosophy behind Lean. The book enabled us also to gain a broader understanding of Lean in terms of the fundamental requirements for Lean to be a success in an organisation and it's easy to read through.

¹ Study-Action Teams, Opening Minds for Organizational Change, CHRISTINE SLIVON AND HAL MACOMBER

2. Why Lean?

Whilst Lean is a term widely used it is less understood and almost becomes a barrier for others to begin the journey of applying Lean in the workplace. Through their own learning the Lean Task Force have endeavoured to capture their experience so far:

- An opportunity to enhance customer value whilst delivering more profitable outcomes across your Supply Chain.
- An opportunity to improve performance where there is no end point
- The world is changing, if we won't change we may be not a part of the future, as a business, a department of a business, as a supplier or a client.
- Why wouldn't we want to improve? With Lean "the continuous improvement" will be done out of habit and become a matter of routine.
- As a 'producer', why pay for producing something your client doesn't want and therefore should not pay for? To reap the highest profit / reward from a situation, you should only do exactly what is required to achieve the client's expectations. There are obviously nice-to-haves which boost your position / situation / customer service / market differentiation. The client isn't going to pay for these so in effect they come straight off your bottom line.
- Lean has been used and has shown benefits in cost, safety, employment and retention, customer satisfaction, schedule reduction and improved quality.

3. What Lean is / isn't

Organisations more often than not wrestle with the basics and don't know how to begin, from the work the Lean Task force has undertaken there is much evidence to provide encouragement and food for thought on how to begin the Lean Journey. There is much literature that can be researched however one may argue there is no real substitute for Learning by Doing. Below are some thoughts from the Lean Task Force based on their initial learning experiences so far in attempting to provide some level of definition.

What Lean Is

- A state of mind, it's a way of thinking, opportunity to improve your business
- Change management
- A long term philosophy that shapes your business culture and becomes your corporate DNA.
- It's about people and processes supported by tools seeking to continuously improve and eliminate the waste (The Non Value Adding elements of what we do)
- It applies to construction, not just to manufacturing. There are good examples where Construction Organisations have adopted Lean with outstanding results, you could become one of them.
- A way of examining what we NEED to do and understanding what we DON'T NEED to do, provides an opportunity to improve which is endless, consider the number of repetitive tasks in your business.
- Lean is the approach to identify and reduce of waste, waste is what the client should not pay for.

What Lean Isn't

- Obvious what it is, need to start the journey and learn by doing
- Something that can be achieved without Senior Management Commitment
- Something that can be influenced from a distance, Senior Management need to be "Hands On", and "Go and See" what is happening in your business.
- Just another set of tools or quick fix, there is no silver bullet
- A short term commitment, it requires a long term vision and shouldn't be done in isolation, need to respect your partners and work with your supply chain.
- To implement it properly the root cause of waste needs to be tackled, not the effect of it. This may be considered one of the hardest areas to articulate - It isn't a short-term solution to anything.
- Lean isn't only tools (as 5S, ...) and eliminating waste
- Only for manufacturing

4. Dos and don'ts

When starting in Lean Construction we have put here the experience of the task force members:

Do	Do Not
Drive lean in the line, involving those who do the work.	Set up project team in parallel to business as usual delivery team
Tightly couple learning with action, i.e. do it don't just train.	Train without acting
Involve top management in steering groups	Try to do everything at once
Plan	Be pressured into starting before you have a plan
Keep an open mind	Dismiss lean as old ideas repackaged
Start today – don't delay. Why would you want to?	Command and control
Learn from mistakes	Be afraid to make mistakes
Build your own support group	
Commit for the long term	
Involve the whole system	
Aim for some quick wins to gain buy in and win over the sceptics	
Have senior management sponsorship and support	
Keep daily progress meetings "short and sweet" Make the benefits visual	

5. Examples of waste in context

The idea of removing waste is a compelling one – common logic dictates that not doing wasteful things will save time and money. Understanding what waste is may not be straightforward – the most efficient process is wasteful if it doesn't deliver anything of value. So, this conversation starts not with "what is waste?" but with "what is Value?". The separation of design from construction makes this a surprisingly difficult issue to deal with – construction activities are executed under the assumption that delivering the work as specified in the most efficient way is providing Value. This exposes an early source of waste in the design and the design process itself, but the topic of design is for another report. Here we are going to discuss waste as it affects construction productivity and we define productivity as the execution of the onsite construction / assembly and the flow of work. This has parallels with the Toyota Production System (TPS) which also relates to the assembly processes. The TPS identifies 7 types of activity waste which map fairly well to waste in construction activities, but the different nature of construction means there are other wastes that are not found in manufacturing. The purpose of this section is to illustrate waste in a construction context by the use of simple examples.

Toyota's 7 wastes (muda – associated with activities or processes)

1. Unnecessary movement – this is very common on construction sites where movement of personnel is frequently mistaken for productivity (being seen to be busy). A true lean site looks empty because everyone is at the place where the work is being done and not walking about. Traditional project managers find this very difficult and feel they have to fill the empty space with workers and materials – this must be resisted as it causes congestion, delays and extra cost. Unnecessary movement is any that takes a worker away from the work for example, finding and collecting materials and equipment. A Lean construction intervention for unnecessary movement includes materials logistics to ensure the worker is kept supplied at the work face and doesn't need to stop working to go and look for things. To implement a logistics system there has to be recognition of the cost of:
 - a. paying a skilled worker to find things,
 - b. the delay in restarting work due having to review progress,
 - c. the impact that stopping the work has on follow on activities,
 - d. the impact on surrounding activities of having other trades moving through their work space on their trip to and from the stores etc and
 - e. the cost of buying in an "additional" activity of logistics to prevent a) – d).
 - f. A case study of the use of logistics was presented by Chris Brumby, AstraZeneca, at the ECI conference in Amsterdam 2011 and can be reviewed in the conference report.
 - g. A less visible effect of unnecessary movement is one associated with ergonomics – making the work fit the worker. So much of construction work is done overhead, requires frequent bending, twisting and lifting or is just difficult due to confined space. The consequences of these are two fold, firstly the accumulation of extra time for each of these movements and secondly the wear and tear on the worker themselves which at least slows them down as they tire during the day and at worst become a chronic health issue (bad back, hand arm vibration etc.) affecting the long term productivity of the industry.
2. Unnecessary transport – closely linked to movement of personnel, this concerns the movement of materials and / or equipment. It is common in construction to buy many materials in bulk in order to achieve supplier discounts. The consequence of this is that quantities of material are moved and moved again around the site and even within the storage compound as materials become inaccessible due to following deliveries – this happens even when there is good storage space. Equipment and plant can also suffer frequent movement from place to place especially if several workers are sharing or if it is left where it blocks the work of other trades.
3. Waiting – this is a controversial waste. It is clear that if personnel are waiting then they are not being productive so it is wasteful. Workflow should be planned so that workers are not idling with materials being delivered to the workface Just In Time. However, sometimes in a construction project it may be better to wait than find work to do for example:
 - a. as construction work changes frequently, work completed ahead of schedule (to keep workers busy) may become obsolete and need to be removed;
 - b. work executed out of sequence may have unforeseen negative consequences for following activities; and
 - c. If the relevant prerequisites aren't in place then it may be better to wait rather than risk defective work, work that can't be completed and requires revisiting later or causes an accident for example.
4. Inventory – again this has a different impact on construction. Unlike manufacturing, inventory does not really accumulate between activities on site as once materials are incorporated they are part of the final structure. Until paid for however, this constitutes Work in Progress (WIP) which has a cash flow impact if payment terms are not adhered to. Excess inventory occurs pre-installation as sites are commonly loaded out with materials, this ties up money just as it does in manufacturing. If the design changes these materials may become obsolete and need to be disposed of and materials stored on site may be damaged or stolen. However, some materials need to be freely available as their cost is too small compared to the cost of delaying the work if they are not available. Again the use of logistics for materials management is helpful in identifying and managing varying material requirements. In construction, the high

number of trade contracts and activity interfaces cause an accumulation of money held in risk contingency funds by the supply chain organisations against the variation (uncertainty) in work flow, associated potential conflict and waste generally. The accumulation of this resource (money) is the construction equivalent (but for very different reasons) of the accumulation of the material resource named as inventory waste in manufacturing. If each supply chain organisation is adding a 30% risk contingency into its contract then that could be defined as an excessive total accumulating across the end to end construction process. However, this is controversial as the risk fund “bucket” often also contains the profit of the organisation. More research is needed to be better recognise, understand and manage this but the goal should be lower risk contingency, more certain profit and an overall reduction in cost to the client

5. Defects – these continue to be a challenge for the construction industry where a list of defects is often the first quality monitoring tool to be put in place on a project. The cost of going back to correct defects is hidden in the risk contingency and as such is covered by the customer and accepted as an unavoidable aspect. To adopt a right first time approach or measure defects in parts per million as in manufacturing is a long way off yet for the construction sector. A detailed understanding of the root causes of defects is needed for any significant advances in their reduction, these causes range from design through procurement to management and planning.
6. Over-processing – this involves visiting and revisiting the same activity without progressing it much towards completion. The most obvious examples of this exist in the administrative process where multiple signatures are required or the activity is passed through several departments or specialisms before the work is released. On site examples stem from the way operatives work, starting work and moving to the next task before fully completing is a deeply embedded way of working. It seems the driving motivation is to allow the next trade to start as early as possible – there is no recognition that revisiting the workforce several times before the work is finished is wasteful as there is a genuine belief that early start of activities means early finish of project. These follow up visits take extra time in reviewing progress before starting the next piece of work, are disruptive to the planned schedule as well as adding the wastes of unnecessary movement and transport and are strongly related to the “making-do” waste of under- or inappropriate processing.
7. Over-production – this waste is very difficult to see in construction as most projects are commissioned rather than speculative unlike the mass production of manufacturing that may be ahead of customer demand. However, providing a higher quality than required or a greater quantity than required is an obvious example of this category of waste. More obscure is completing work ahead of schedule – this is often caused by not wanting the workers or the work to wait (see 3 above). In general, this waste is more commonly found within and as a result of the design activities.

Other forms of waste:

1. Under-use of human potential – this is a common form of waste in construction where by the people who do the work are rarely consulted about how to do and improve the work. It is closely allied to the control and command form of management whereby work is executed simply by orders. Engaging people and allowing them to have conversations about the project promotes creative thinking – not to do this is wasting their potential.
2. Making do – this is the waste caused by starting work before all pre-requisites are in place. Causes defects and rework and is common in construction projects. One of the most serious is making do with insufficient or unsafe space in which to work including having too many trades sharing a working space especially at multiple heights.

Some member case studies are provided below to further illustrate aspects of these wastes within construction:

Examples of waste observed within an engineering construction pipe manufacturer / installer include -

- A site could be expecting some piping due for delivery as per the contract programme. The labour resource is employed, the plant & equipment is delivered, the access is co-ordinated ready for the piping to be installed. Unfortunately the workshop could have a “rush” job come in for a client on a shutdown and all workshop labour has to react to this work and therefore the expected piping is delayed. This has caused wasted time, effort & cost in organising the site work. It has caused wasted labour hours (downtime) in re-directing the site labour onto other works (that is if some other work is available).
- The workshop could be working hard to meet their delivery requirements from the contract programme. They have worked hard and delivered the piping to the scheduled date. Unfortunately the client has not arranged access because their priorities have changed. The piping will now sit in laydown on site and require double handling when installation is available. This has caused wasted time & effort for the workshop, wasted laydown space & wasted time in double handling.
- Deliveries could be late or installations put on hold due to items of plant or materials not being ordered because they have been overlooked or it was thought that it was “somebody else’s responsibility”. This causes downtime & reactive behaviour which has a knock-on effect to other jobs & tasks.
- We are installing piping on a project and another contractor is completing the electrical installation. We both have separate contracts that include for the provision of fixed access scaffold. Although the cable routes and piping routes are in the same areas separate scaffolds are erected at different times rather than one scaffold to suit both needs causing additional costs to the project. As well as this the cable and the pipe supports have been installed separately when in some cases, supports could have been designed and installed to accommodate both trades services.
- A client tell us that there is a pipe line to run by a certain date and the design and details will follow. When the details (which include a P&ID, arrangements and isometric drawings) finally arrive we are told that we only have a short period of time to install the line. We reply and tell the client that we believe the date can be achieved however it will involve changing the route of the piping to make it simpler to install and support. The client agree to this but are disappointed about the wasted time & cost to provide the original design that could have been avoided if the routing was discussed with us at the design stage.

These examples need to be put into context with the seven wastes:

1. Transportation – the examples identify wasted transport of piping to site and double handling from laydown.
2. Inventory – the examples show examples of wasted laydown and the workshop working on piping that isn’t ready for installation.
3. Motion – There are examples of avoiding motion waste by suggesting simpler installing routing. Also with piping & electrical contractors working separately leading to additional support installation in possibly difficult areas.
4. Waiting – The examples identify the site waiting and expecting piping that doesn’t turn up. Also the piping & electrical contractors working separately could lead to co-ordination issues that result in one contractor being held up.
5. Over Processing – Could you use the wasted design from the client in the last example as too much information that wasn’t required?
6. Over Production – Could you use examples of workshops sending piping to site before it is ready for installation?
7. Defects – There are many examples of defects that could be used.... Design incorrect causing clashes, items not being checked following fabrication & installation..

It can be seen here that construction activities do not fall neatly into individual waste categories but are often examples of several different types of waste all at once. For this reason, the classification of waste although helpful to gain a general understanding, should not be used as a rigorous tool for project management. It is much more important to be rigorous in the definition of value and then allow waste to emerge from that understanding.

6. Links to other ECI Task Forces

Lean is a state of mind and has links to many other activities as it becomes a way of working. Within ECI there are several other task forces and in this section we explore how understanding the work and recommendations of all the taskforces helps to embrace the complete benefits of lean.

6.1 ACTIVE

Background & Aims

The ACTIVE approach is an initiative aimed at improving the performance and competitiveness of capital projects in the process, energy and utility industries. It was founded in 1996 with UK Government funding and was re-launched as ECI ACTIVE in 2002. ACTIVE espouses eight principles of collaborative project management ACTIVE supports these with a number of value-adding practices captures in a wide variety of training materials, tools, documents and benchmarking assessments.

The aim of the ACTIVE taskforce is to continue to support and promote the use of ACTIVE throughout the European engineering construction sector. It will achieve this through:

- Gathering together a portfolio of cases that have used ACTIVE and understand what lessons can be drawn from these
- Working with other organisations and stakeholders in insuring that ACTIVE adapts and continues to represent the best way to run projects

Links to Lean Task Force

One of the ways to successfully deliver Lean principles is to have the ability to combine a number of ways of working to add value to the task in hand. ACTIVE is a key way of working that aids project delivery and therefore a great complimentary activity to Lean.

6.2 Collaboration

Background to the Taskforce

The Collaboration Taskforce grew out of one of ECI's most successful taskforce initiatives of recent years, the Futures Taskforce. The Collaboration Taskforce's approach was based on an approach used by PWC in its 11th annual CEO survey in 2008 which highlighted the importance of collaboration in business performance. The Taskforce wanted to understand what collaboration meant to the engineering construction sector.

Aims and Activities of the Taskforce

The aim of the Taskforce was to understand what collaboration means to the engineering construction sector in five key areas:

- The supply chain
- The pursuit of talent and retaining people
- Regulatory harmonisation
- Addressing major global challenges
- Access to new markets

The taskforce interviewed over twenty individuals in ECI member organisations. The sample included clients, EPCs and smaller contractors. The taskforce then analysed the responses in each of the five areas to understand collaboration in an engineering construction context.

What the Taskforce Discovered

Collaborating in the supply chain

- The suitability of projects for collaboration does not lie in the characteristics of the product (e.g. complexity) but lies in having the right **relationships** in the project:-
- Clients and EPCs understand alliancing differently
- Trust is seen as the most important prerequisite for collaboration

Links to Lean Task Force

Lean principles work best when a number of areas of key activity are linked together and the collaboration task force's findings about having the right relationships align very well with the requirements to implement a lean approach. One of the key elements of successful collaboration is for all parties working together to form a trusting environment, again this dovetails very nicely with lean, as one works toward building a team that will try relatively new ideas and techniques to the construction industry.

6.3 People

Terms of Reference

The terms of reference of the Taskforce are to identify best practice, create new knowledge and to support its use in order to:-

- attract and recruit people
- train and develop people
- appraise and reward people

in the European Engineering Construction Industry to enable the effective delivery of projects

Links to Lean Task Force

To date an area that the Lean Task Force has established is that Lean is more than just a tool kit of principles, more importantly it is how they are used, applied and supported by the people implementing them. Therefore having the right people is key, as established by the People Task Force and the lean environment provides a supporting and nurturing arena for people development.

There is a strong link between ACTIVE, People and Lean task forces, through the right people working in the right teams in the right way.

SHE

Mission

To provide guidance to ECI members on construction safety, health and environmental issues in particular from a pan-European perspective

Objectives

- Provide a pan-European forum for its members for networking and developing a mutual understanding
- In conjunction with the ECI Executive Board define and champion SHE policy and strategic plans
- Promote improvement programmes and actively encourage members' involvement in safety, health and environment
- Enhance ECI's image and EU relations for the benefit of its members and the industry as a whole

Main Activities

- Champion SHE issues, providing leadership and technical expertise to members
- Develop SHE taskforce measurable objectives and incorporate into an annual SHE plan
- Encourage regular individual member participation in the SHE task force meetings
- Liaise with regulatory authorities to ensure legal compliance and anticipate new legislative requirements
- Monitor achievement of objectives against the annual SHE plan

Links to Lean Task Force

Everything we do has to be done safely and therefore it is key that all the principles recommended or developed by the Lean Task Force form part of the remit of the SHE Task Force and vice versa. Delivering projects through Lean techniques will show an increase in occupational health, ergonomics, safety statistics and reductions in waste and environmental impacts. This is as a direct result of the improvements not only in speed of delivery but also the way projects are delivered.

6.4 Young People

The ECI Young Professional's Action Group is a group of the most talented and dynamic young construction professionals in Europe.

Activities that are currently being carried out by the group include;

- Providing additional fresh resource to ECI's highly regarded research task forces
- Organising a programme of valuable learning workshops targeted at young construction professionals.
- Creating a strong young professional's network that will be both invaluable to the future of the ECI and to the creation of high value relationships that will have a positive impact on parent organisations in the years to come

Links to Lean Task Force

A number of the principles of Lean challenge the traditional way that the construction industry has run and the best people to champion new ways of working are often young professional as they begin their careers; therefore it is key that the principles of Lean are embedded into the development programmes of the young professionals. Lean will assist in getting young people involved in developing their chosen industry, give them empowerment and work as a long term initiative.

Conclusion

During the period covered by this report the task force has investigated what lean means, what it is and how it could be used to help improve the performance of companies within the sector. Clearly emerging from that investigation is the task forces' overwhelming opinion that the philosophy of lean is wholly applicable to the construction environment from project concept, through design and construction to delivery.

This initial report is merely an overview, the task forces' investigation has clearly focused on the lean philosophy rather than the tools or processes. We have looked for examples of waste in a construction context identified as a result of lean thinking and discussed the issues affecting our own companies that might be addressed by a better understanding and adoption of the lean philosophy. Fundamentally lean focuses on long term business sustainability by better meeting the needs of customers, as a concept it provides a philosophy and set of tools to enable any company to provide the best chance for its own success.

Industries and companies based in other sectors, such as manufacturing, have clearly adopted the lean philosophy to considerable good effect but it is sometimes difficult to visualise the transferability of their well established processes. The proposition of recognition as a world leading, value enhancing partner of choice should be enough to attract the interest of most companies in the sector, when that proposition is coupled with demonstrable increases in safety, productivity, profit and stature the proposition moves from one of attraction to necessity in a demanding and competitive business environment.

Whilst the task force accepts it is not easy to visualise exactly what a truly lean company in the sector might look like at this stage, they are convinced that moving towards a philosophy of continuous improvement focused on customer value offers significant benefits to clients, companies, individuals and society.

The task force will continue the investigation by next focusing on how best to start the lean journey, how tools are best used in a construction context and what else needs to be done to enable the transformation process to be better understood and applied in a lean construction context.

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Christine Slivon and Hal Macomber, *Study-Action Teams, Opening Minds for Organizational Change*.

ECI Lean Task Force members involved with this publication:

Tom Stammer	AMEC
Chris Brumby	AstraZeneca
Ray Sanderson	BG Group
Menno van der Geest	CB&I
Sabine Verdickt	DuPont
Chris Mann	ECITB
Martin Branton	Kingsfield Consulting International
Tom Ventre	Laker Vent Engineering
Ben Charles	Laker Vent Engineering
Christine Pasquire	Nottingham Trent University
David Adamson	Sellafield
Arnaud Lemaitre	Veolia Water
Nigel Barnes	WSP CEL

For further information about the LEAN task force and publications please visit

<http://www.eci-online.org/taskforces/lean/>



ECI, John Pickford Building
Loughborough University
Loughborough
LE11 3TU, UK

T +44 (0)1509 222620

F +44 (0)1509 260118

E eci@lboro.ac.uk

www.eci-online.org