

COMPANY OVERVIEW



COMPANY WEBSITE
www.CField.ie

CField Construction is a Building & Civil Engineering contractor with operations in Ireland and the UK. We have extensive experience in a wide range of sectors, including Pharmaceutical, Residential, Healthcare, Leisure, and Commercial. Since our formation in 2011, the Company has experienced significant growth with turnover reaching approximately €80Million 2018. Our goal is to deliver all projects to the highest quality, in a

safe, cost-effective and timely manner. We aim to form lasting relationships with clients by delivering excellence in a friendly, engaging and professional manner and see this as a key measure of the success of our business. Our team has a diverse range of skills and is committed to working closely with our clients, professional teams and supply chain to develop pragmatic, innovative and cost-effective solutions to achieve maximum value on each project.

OVERVIEW & BACKGROUND TO THE LEAN INITIATIVE

AUTHOR



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In late 2017, CField Construction recognised that a new approach to how CField managed its sites was needed in order to increase productivity, reduce costs, reduce waste, and maximise profitability – and so began CField’s journey into Lean Construction initiatives.

Our initial Lean initiative was based on a large-scale residential housing scheme in Cork. The project consisted of the construction of over 130 semi-detached and detached 3 & 4 bed houses, as well as all associated site civil works, including road ways, storm/foul attenuation tanks, etc. The overall

project value was €31Million, on a very tight programme with multiple handover dates as the scheme progresses. Interestingly, the project team did not start off with a Lean approach and this was only introduced approximately 60% into the project timeline.

While in discussion with senior management and the site management team, the following four areas were identified that could benefit from a Lean approach:

- i. Material ordering.
- ii. Procurement.
- iii. Storage, handling, and end use on site.
- iv. Improved communications.

LEAN INITIATIVE UNDERTAKEN – LEAN THINKING, TOOLS, TECHNIQUES

In order to fully grasp the scale of the project, the site team looked at the entire process as a starting point. The team completed Lean training, which provided an overview of a Lean approach, including the 8 Wastes, Value to the Customer, impact of variability, and Lean Process Mapping.

is ‘out of stock’ on site to the moment new material is unloaded and/or used on site).



Figure 1. Lean Training In Action

On completion of training, the process was mapped during an interactive session involving all the site management, purchasing department, accounts department, a selection of site operatives and facilitator. Visual “swim lanes” were utilised to identify each step and the decisions made during each step. The decision makers were identified as per Figure 2 (mapping the current state process from the moment material

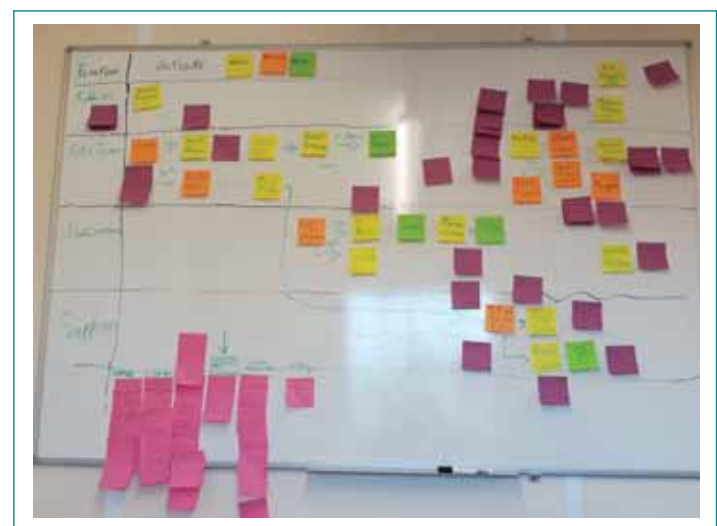


Figure 2. Mapping the Current State Process

From mapping the process and analysing it in relation to the 8 wastes of Lean (“TIMWOODS”), it was clear that there were four key areas which would form the starting point for the Lean initiatives and improvement: i) Material Ordering; ii) Material Delivery; iii) Material Handling & Storage; and

iv) Improving Communications.

Material Ordering

Then – Traditionally the onus was on the site team to monitor stocks of each material, anticipate the requirements of various trades for the coming weeks, consider the lead times for each material, and place orders. Site management would often be notified the evening before that a particular trade was running low or out of material for tasks the following day, or that material couldn't be found in a particular location. Time was lost searching for materials before an order was placed.

Now – When ordering materials, each subcontractor is now responsible for their own ordering or notifying the site team when a material is running low in stock. This is done using a formal material order sheet which is available in the site office. Each day at 15:00 the orders are placed, and subcontractors know that there is a 5-day lead time from the date ordered. Kanban (similar to the method used in Lean Manufacturing) was utilised in the storage areas where clearly marked storage containers were manufactured to trigger an order when a certain material was running low – thus eliminating time wasted looking for materials.

From the original mapping exercise, the site team was under the impression that a 3-day turnaround time from the day the material was ordered to delivery was achievable. However, when mapped with purchasing and accounts present it became apparent that a 5-day lead time was more realistic. We have also developed a list of common materials and lead times which do not fall into the 5-day window, such as materials sourced from the manufacturer, etc. Once the order form is complete, an order requisition is generated and sent to purchasing, who in turn relay an expected delivery date to the site management team.

Material Delivery

Then – Material ordered was sent out for best price analysis, and once a price was agreed with the chosen supplier it would be dispatched to site. There were regular issues with deliveries coming in part loads, incorrect materials arriving and being unloaded, deliveries during peak times, or deliveries not arriving at all. Once on site, materials would be placed into designated areas that would often be congested due to excessive materials being ordered or lack of loadall time to keep the area in good order. Delivery dockets would be lost after delivery or not signed, leading to significant delays in accounts payable.

Now – When the material is ordered, an expected delivery date is relayed to the site team and this is then placed on a white board in the main site office for loadall drivers and subcontractors to see (Figure 3). Each morning a quick huddle with loadall drivers happens during which we review deliveries from the day before (crossing them off the whiteboard if delivered) and discuss the deliveries for the day as well as important tasks to be completed. Delivery dockets are returned each morning and a box is also available in the site office for operatives to hand in dockets. It is interesting to note that following the initiation of the Lean project, operatives suggested that all deliveries which require on site lifts be deferred until 10:30

each day thus allowing trades full access to loadalls first thing in the morning.

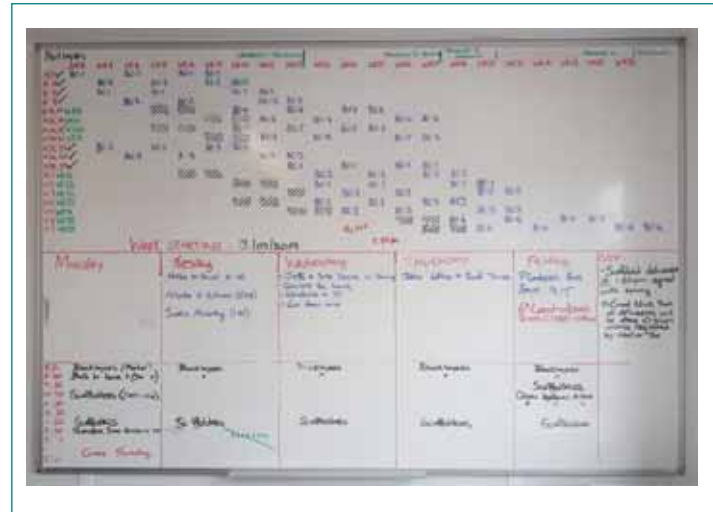


Figure 3. Daily Delivery Tracker

Material Handling & Storage

Then – Materials would arrive in large quantities (Over-Production) and be unloaded in no particular order. Materials were often taken from the set down areas in large quantities and brought to the work area, only for the majority of the material to be either returned to the set down area or left behind by trades people, leading to excessive handling and damage – all of which was creating significant cost increases and time delays for both subcontractors and the main contractor.

Now – Each element of the project has been scrutinised to eliminate waste materials as far as reasonably possible. The site team went to the place of work (Gemba) to observe how the materials were handled, how many times they were moved, etc. The site team and subcontractors are aware of exactly how much of each material is required per house and how many houses will be completed each week (using a given material) and so we are able to order just in time (JIT) materials meaning that more can be delivered to the door of the house. For example, all internal slabs (measure to minimise waste) arrive two days before the roof is installed and are lifted in before the roof is lifted on – eliminating issues of storage, double handling, and ensuring the material is in a dry environment eliminating waste.

House kits have been developed, meaning suppliers kit materials for a specific house – a very worthwhile example is the second fix joinery. A bulk order has been placed for this material and the quantity for each house is known. When the house is ready for these materials, they are called down, arrive on site within 24 hours, and are delivered straight to the house. This has also been done for second fix mechanical and electrical materials, paint, tiles, paving, etc.

Improving Communications

Comparisons can be drawn between a manufacturing facility and a residential housing scheme – for the most part each house is the same with little change to standard details. With this in mind, applying Lean techniques and solutions

is quite achievable in a residential environment. Key elements of Lean are the visualisation of the work by both the site team and the subcontractors, collaboration, and the development of your subcontractors as partners and key stakeholders in the process. Taking this into account, the site team introduced weekly meetings with all stakeholders (subcontractors) present to review the previous week's work and look ahead to the following week, and briefly touch on the month ahead (see Figure 4). This in turn greatly improved work flow, allowing materials to be ordered in a timely manner when work can be mapped out by the people doing the work.



Figure 4. Weekly Coordination Meeting in Progress

LEAN INITIATIVE IMPROVEMENTS & IMPACT

From analysing processes at the chosen residential site under the four main headings and applying Lean principles to the given situations, we have noted that significant improvements have been made not only on that particular site but on other sites that have taken onboard the learning, in addition to other departments within CField.

Some specific examples from the initial residential site analysed are illustrated in Table 1.

Table 1. Residential Site Improvements

Improvement achieved	As a result of
20% reduction in late orders being placed.	All subcontractors are now aware of the 5-day lead time. Introduction of Kanban in the material storage area.
37% reduction in time spent by Accounts Department arranging and analysing dockets.	Hold daily meeting with loadall drivers on site. We now get dockets back to site office in short time and good order
9% decrease in loadall hours on site (with associated reduction in costs).	Most material now arriving in house kits or going directly to the place of work.
Improved site presentation with 33% decrease in the set down/material storage area.	Set down area is neater and less materials delivered.
15% decrease in waste materials sent off site (excess stock, damaged goods).	Reduction of materials on site to eliminate waste where possible.
Reduced waste material ordering (over-purchasing of goods to account for waste/snags/offcuts) from 8% to 3%.	Ongoing monitoring of materials ordered per house to reduce over-ordering going forward.

Further Work – Achieving Sustainability

“Best is the enemy of Better” – a key element of Lean is the Plan, Do, Check, Act (PDCA) method. CField

Construction has now taken these Lean solutions and applied them to other residential projects in our portfolio. It also has to be noted that not all of the above work for each project – it is all about finding what works for each project.

For example, another large-scale residential project (circa 150 dwellings) has adapted the Material Ordering element and developed it one step further. The project team took the time to measure as many bulk order materials as possible before the project commenced – setting up bulk orders not only for concrete, stone, blocks, etc., but also for drainage material, first fix joinery, etc., as a fixed price with a fixed supplier for 12 months. This allows the site team to deal directly with the supplier, eliminating the need for time consuming paperwork and delays in having to find the best price for each and every order.

CField Construction has also used the aforementioned project as the start point for a number of other Lean initiatives looking at eliminating rework due to snags, improving the programme and increasing stakeholder (subcontractor) engagement in the project planning process.

CField Construction Senior Management Team has completed a Lean Training workshop. As a result of the understanding of Lean concepts gained during this workshop and the practical benefits yielded to date from the initiatives listed above, the Senior Management Team has committed to have 50% of all CField Construction employees Yellow Belt trained by the end of 2019.

