

LEAN CONSTRUCTION 'A BETTER WAY'



INTRODUCTION

The purpose of this booklet is to share with people just how far the Jones Engineering group (JEG) has travelled already on our Lean Journey. It has been put together by the project team on the Intel campus to demonstrate the steps we have taken to date, and to highlight the changes we've made that we are most proud of. We also hope to offer a glimpse of the future and where our Lean Journey might take us. The Jones Engineering Group has adopted the Lean way as the way forward because put simply, it's 'A Better Way'.

Peter Cooney *Project Manager*



THE 9 STEPS

- 1. Start Point....The Need For Change
- 2. Project Structure Re-Organisation
- 3. New Project Controls
- 4. BIM Improvements
- 5. JEG Lean Training For Management And Supervision
- 6. Last Planner Training
- 7. 'A Better Way' Employee Suggestion Programme
- 8. JEG, Intel, DPS Sign IFOA Agreement.
- 9. Future....



STEP 1 START POINT (THE NEED FOR CHANGE)

Construction is changing and this change is nowhere more apparent than in the P127X TI Project. The industry is being forced to change at an unprecedented pace. Commercial competiveness combined with fast track schedules and greater complexity of construction techniques are driving the need for change.

It was critical for us to begin to embrace emerging industry practices in order to deliver on existing projects and to preposition ourselves to succeed in new markets. The initial steps on this journey included an intensification in applying waste reduction principles and an improvement in efficient performance in general. The advancement in BIM deliverables and the implementation of Lean Construction methods was critical to change the trends on the project and has helped us to change behaviours and to create a culture which will support the company's strategic approach to remain relevant and competitive. In this transition, Lean will significantly contribute to our business development efforts as it serves to broaden our knowledge of systems, methods and technologies to deliver solutions and services offered in today's market.

Brendan McAtamney Contracts Manager

STEP22 PROJECT STRUCTURE RE-ORGANISATION

A key factor to a change in fortunes came about with the selection of a management team with the vision and experience to produce a significant step-change in the way the construction project was operating.

The new formation of the project team acted as a catalyst, working closely with the craft personnel, to drive the ongoing value engineering, Lean and continuous productivity improvement programme.

From the start, the entire team sought to maximize the group's expertise during the BIM Design & Construction process, providing an opportunity to:





- Inject creativity into the entire team
- Encourage teamwork and knowledge sharing
- Provide improvements to all areas
- Improve quality
- Reduce waste.

The results of the value engineering exercises have been impressive and added significant value.

The next step in the strategy was developed to deliver closer cross business working relationships with the Client, consultants and the supply chain and work as an integrated team with a single team commitment, where all parties including 2nd and 3rd tier members are deemed to be an equal partner and their contribution valued.

To reinforce the partnering culture and project chemistry, considerable emphasis and investment was placed on team building, communication and upskilling (LPS), through workshops and group sessions, to create the 'virtual company' ethos and single project delivery philosophy. This, in turn, led to an increased level of trust, crucial to the successful operation of the team. The result was a gathering and harnessing of the diverse range of stakeholder knowledge, skills and experience, to achieve schedule deliverables, cost, quality and performance benefits.

Brendan McAtamney Contracts Manager

STEP 3 NEW PROJECT CONTROLS

Background to Implementation of Improved Project Controls

- Productivity levels were impacting contractors ability to remain cost competitive
- Increased risk to meeting client schedule deliverables

Improved Project Controls System Enhancements

It was clear action was required if we were to remain an integral part of the construction process on the Intel campus. The following overview explores the key aspects in our ongoing evolving journey in innovation.

IT Infrastructure upgrade

Realisation we needed to remove the obstacles preventing the project team adapting to this new construction environment

• Set-up of LAN hubs in Subfab caged areas to speed up information flow between site and office location • Viewing stations with secured laptops for accessing "live database" information

Document Control Features

Document Control is a pivotal point in the controls infrastructure due to the additional control requirements associated with BIM approach to maximising off-site pre-fabrication coupled with the size, complexity and logistical constraints prevalent on the Intel site.

- Improved system for uploading of key project IFC information into communal database system
- Tool LSP IFC Documentation
- Tool IFC Isometrics
- Rigid conformance to internal Transmittals system
- Ensures revision change control
- Provides traceability on documentation issue dates, location and status.

Improved Progress tracking data collection system

 Addition of QR codes to lso_ spool level - This new feature serves a dual purpose acting as quality control indicators requiring verification by the owner at each step of the check process before scanning and also providing the progress metrics required to accurately track schedule performance

Improved Schedule Change Management systems

- Weekly automated reports generated to alert project team of any changes to schedule interim milestones dates impacting live construction
- New collaborative joint Intel / Contractor process in schedule levelling for optimum craft resourcing consideration.

Newly formatted Reporting Dashboards

- Considering the huge volume of background information available and the pace of construction on the Intel tool install project we believe it was imperative to improve how we disseminated this information into a format that would assist the team in managing the project. To that end we have invested considerable effort in tailoring our existing reporting infrastructure to accommodate the specific requirements of a tool install project.
- Weekly Dashboard report originating from the central database system which is issued to provide the project team with a concise overview of current project statistics on one interface.

- Lookahead reports by FA to alert team of all pending tool milestones
- Tool Status Dashboards to provide a more detailed synopsis of tool status for project team members

New Tool performance Measurement Methodology

- Roll-out of new Tool workpack strategy for greater visibility on scope tracking utilising agreed IFC manhours for benchmarking
- Improved accuracy on appraisal of tool progress status via the new QR code scanning process
- Full chronology on crew allocated spent hours per Tool Workpack

Resulting Benefits that have accrued since we undertook this journey:

- Schedule certainty as Jones Engineering is now at a stage in the project life cycle where we are exceeding schedule deliverables
- Improved cost performance has ensured Jones
- Engineering remains competitive
 Collective buy-in from project team to deliver utilising improved project control systems
- By-product has been the creation of a competitive culture whereby ethos to drive efficiencies is now embedded in the project team

Brian Buffini

Project Controls Manager



STEP 4



If we were to go back 3 years when Jones Engineering were completing the BIM Pilot tool in advance of this large scale construction project, not many would have foreseen the fundamental changes that we would implement in our approach and our delivery of BIM. From the outset, clear gains could be seen by adopting this 3D BIM technology for coordination, clashing, procurement of materials etc, but how could Jones Engineering BIM improve on this and "raise the bar" on other key elements?

As BIM itself is not the final output but just a means to assist construction in achieving their LEAN targets, every element of 3D detailing needed to be evaluated. When reviewing examples of other BIM projects in the construction industry, only the larger Mechanical and Electrical services had primary supports and general routing was only applied for the smaller services without any evidence of secondary supports. That might be adequate on a "less congested" project where 20 to 30 lengths of unistrut might be utilised for any given service run, but Jones Engineering were looking at anything up to 600 various lengths of unistrut per tool and over 550 tools...

Key to the success of efficiencies gains in the field was for BIM to not only model services that went from Point A to Point B, were clash free and constructible, but to also model these services "fully supported" across the different specifications and sizes. Jones Engineering BIM team developed their own Intelligent support/ bracket database including unistrut channel, unistrut fittings, threaded rod along with pipework, ductwork, and electrical fixing clips. All of which can be fully quantified including exact X, Y, Z coordinates at the "click of a button" and allow Jones Engineering Bracket Crews to install with "BIM-Point accuracy".

As Jones Engineering construction requirements evolved over time, incorporating new ideas and alternative methods, the output from Jones Engineering BIM constantly changed to meet these needs. Some high level "BIM-Provements" driven by Construction LEAN can be seen below:

- Isometrics incorporating a detailed image of the 3D spool section to assist offsite fabrication and eliminate misinterpretation.
- Standardising and prefabricating Facility Racks for different tool types (3D CAD Block, Golden BOM & Isometrics)
- Stainless steel Interconnects Jigs (3D CAD Block, Golden BOM & Isometrics)
- JEG "Control Network" employed in the field for accurate setting out of brackets and M+E services was incorporated on all Construction Packages issued by BIM.
- Revised bracket design concept in the Fab Level allowing for

Finish Floor Level (+/-30mm) discrepancies.

- JEG 3D models populated with Popouts Collars & with Embedded Unistrut in the Waffle Slab.
- FPOC "Exact Supplier" survey for accurate Identification of continuation fittings (Different "approved" basebuild valves required specific Tool Install fittings)
- BIM detailing group of tools rather than tool by tool.
- Modified detailing concept for certain services and specs to allow for alternative suppliers with different fitting dimensions.
- ID of Flex Lines running within carrier (support) pipework on Construction Packages issued by BIM.

The largest example of a "BIM-Provement" is without a doubt the utilisation of "Point Clouds" and "Tru-View" files. Many Architects, Engineers and Building Contractors in the Construction Industry acknowledge and accept an overall building tolerance of anything up to 50mm (2 Inches) depending on the building type & application. This however is not feasible when Jones Engineering need to accurately install M+E services that are 6mm in diameter within exceptionally congested areas. A 3D model of existing elements of Fab14 and Fab24 were provided to Jones Engineering incorporating primary steel, catwalk, existing M+E services, finish floor, waffle soffit etc. These models however contained inaccurate information such as a "flat" waffle soffit,

incorrect location of existing supports and services, missing elements. These items combined, hindered accurate installation of the M+E Tool Install services in the field as the 3D model itself was incorrect. However the utilisation of "Points Clouds" together with "Tru–view" files have allowed the Jones Engineering BIM detailing team to overcome these issues and to design a 3D model utilising exact site conditions and limitations.

Previously both BIM and Lean Construction would have been considered two separate identities within the Construction Industry. However it can now be said that Jones Engineering Group have successively merged these two initiatives, adding value to the customer through the elimination of waste, reduction in activity durations and standardisation of key processes and design concepts.

John O'Brien BIM Design Manager

JEG LEAN TRAINING FOR MANAGEMENT & SUPERVISION



In response to the rate of change taking place within the construction industry, JEG senior management recognised there was a need for change within our own organisation. The current business culture demands continuous improvement and the current drive towards 'Lean' in particular, required a big change in thinking

on 'how we do things'. To that end, JEG looked outside the organisation and engaged with a Lean expert to tailor a course for JEG management and supervision that would enable them to be at the vanguard of the 'Construction Revolution'. The aim of the course is firstly to demonstrate the need for change and then to empower

JEG management and supervision with the responsibility and skill set to make the change themselves and to be the catalyst for change on each of their respective projects. The course focuses on management and leadership skills and the Lean philosophy. Courses are held in various locations throughout the country to ensure that the entire organisation is on board the lean journey.

To date, the results from these courses has been extremely positive, each group that completes the course, return to their projects tasked with coming up with new ideas to make change happen and empowered to follow them through. Overleaf are just some of the ideas and the changes made on the Intel site as a direct result of completing the course.

Peter Cooney Project Manager



RESULTS FROM JEG LEAN TRAINING

- 1. Orbital Welding Improvements
- 2. Column Mounted Vices
- 3. Labelling Process Improvements
- 4. 'A Better Way' Initiative
- 5. Tool Jigs Modularisation
- 6. Bracket Install Process Improvements
- 7. Waste Walks

- 8. Site Survey & Set Out
- 9. Welding Purge Process Improvement
- 10. Logistical Improvements
- 11. Pvdf Installation Controls
- 12. The "Lean Times" Newsletter

NO. 1 - ORBITAL WELDING IMPROVEMENTS

What we were doing in F14 – the need for change

Productivity output from each of the orbital welders during the F14 TI Project was identified as below average. A working group was put in place to review the process and identify any waste actions. They discovered a number of fundamental issues which were hampering efficiency; most notably the following;

- Functional Area groups, individual crews and stand alone orbital welders were all operating in isolation (Silo effect) and not sharing learnings or problems.
- Welds were being identified to the welders on an "as needed" basis requiring welding plants to be moved during the shift
- Common tools and equipment were not located in central locations causing a lot of lost time locating these prior to use

Changes that we made

The process was reviewed in the field by the working group and documented using the Value Stream Mapping tool (VSM) and the following improvements put in place. A central resource has been set up to cut and prep coupons for all welders, saving time and eliminating queuing for facing tools. The five S system has been adopted, where organiser boxes containing all commonly used equipment (collets, feeler gauges,





tube cutters) were issued to each welder, saving time as welders now do not have to leave their place of work to locate equipment. Each has a full set, stored in exactly the same way. Each welder is now shown his full daily scope at the start of the shift and positions his weld plant centrally so no moves are required during the day; thus saving time and eliminating additional coupons required after any moves. What we achieved - results By making these changes, we have made dramatic improvements to orbital welding productivity. Time savings in the region of 30% have been possible and output has been doubled in many cases. Where orbital welding had been identified as a constraint on site in the past, this is no longer the case. The focus has now switched to identifying and improving the next problem

Simon Watson Team Development

NO. 2 - COLUMN MOUNTED VICES

What we were doing in F14 – the need for change

As a side effect to our review of improving productivity among the orbital welders on the Fab 14 TI Project, we picked up that too much time was being wasted needlessly by welders having to walk a considerable distance to find a work bench with a vice to allow them to cut open their weld coupons.

This is a task that can take place a number of times during each shift and is directly related to the number of different lines that the welder works on over the course of the day. The fact that this task takes place multiple times each day and is carried out by each welder individually, means there was scope to make significant time savings if a solution could be found.

Changes that we made

By reviewing the problem objectively it was seen that we could not just issue additional benches with vices attached to each welder as the space within the Subfab was at a premium. The idea of having a portable vice was discussed and developed until we came up with the solution to mount a small mobile vice onto a cantilever unistrut frame, designed to bolt to the embedded unistrut channels in the Subfab structural columns.

What we achieved - results

The fact that the cantilever frames can be attached to any subfab column quickly and easily means that each welder can move his vice to a suitable location adjacent to his work area and save on the walking time that would have been lost if we had continued as before. This has helped contribute to the increased efficiency we have achieved from all of our orbital welders. The problem we face now is how to keep the other trades from using our vices, as they obviously find them very helpful as well!

Eric Hendrick Mech Supervisor



NO. 3 - LABELLING PROCESS IMPROVEMENTS

What we were doing in F14 – the need for change

When we looked at many of our ongoing processes across multiple areas on site with Lean in mind, the production and installation of our pipe labels was identified as an area we felt could be improved to be more efficient. With that in mind, we sat down with our label production team, our QA team and our Supervisors to look at our current processes using a lean approach to see where we could improve. This is what we found.

A high volume of our line walk snags were label related for multiple reasons. Labels were being produced in an inconsistent manner. I.e. Text size and Text compression. We had a high volume of material waste. Labels were being issued to site in rolls with multiple lines on the one roll. (This caused confusion and delays on site). No QA procedure was in place in the print shop.

Changes that we made

We set up a new label master data base to eliminate the issue with inconsistent text size and compression.

We developed a new label installation guideline board and issued it to all functional areas. We expanded the label print shop, creating a better flow in the workspace from printing to cutting/ packaging the labels. Training was provided on waste management. A





quality checklist was developed to be checked, signed and issued with each label delivery.

New equipment was purchased providing quicker cutting speeds which helped meet the constant demand.

What we achieved - results

Lean Works. The action of looking at our label process from printing to installation with a lean approach proved to be a big success. Following the implementation of our solutions outlined above we have achieved the following.

- We have greatly reduced label related punch list items for our QA walk downs.
- We have eliminated the production of inconsistent labels.
- We have eliminated 90% of our label reworks/reprints.
- The QA check list is a big success

Everyone from the lads making the labels to the lads installing the labels is happier with the new processes and is also working more efficiently. Result.

Warren Baird Construction Manager



NO. 4 - "A BETTER WAY" INITIATIVE

'A Better Way' is an employee suggestion programme set up by JEG on the Intel site to encourage new ideas from every JEG employee. It's goal is to harness the knowledge and expertise of all JEG personnel onsite and to use that knowledge to create a leaner, more effective working environment. To encourage participation in the scheme, each suggestion that is implemented receives a 'One 4 All' voucher. To date, the scheme has been very successful and is described in more detail in 'Step #7'. It is viewed as a major milestone in our Lean Journey as this is the point when each and every crew member had access to a direct and simple mechanism to influence change and JEG management had a direct link to the knowledge and ideas contained within the 800+ experts onsite.

Peter Cooney Project Manager



NO. 5 - TOOL JIGS MODULARISATION

What we were doing in F14 – the need for change

When constructing HP piping interconnects on Dry Etc Tool JIGS our crews were bending out one tool and one line at a time for just one specific Tool. We only had 4 JIG's available to us during the construction phase of F14 due to space allocation which meant we could only fabricate 4 Tool interconnects at a time.

This really hindered us throughout the project and this was very evident when approaching SL2 Construction Finish dates. Needless to say we missed some dates and moral was low throughout the team!

Changes that we made

With the help of our Intel PM's we fought for and acquired more space in Fab 14 Fan attic in order to build more JIG's to facilitate the upcoming Dry Etch Schedule in Fab 24. We now have the following JIG's at our disposal

REX JIG – 4 No. TAO JIG – 6 No. ONT JIG – 3 No. ANT JIG – 2 No. OXT JIG – 3 No.

We also have 4 new bending tables in F14 Fan attic to service the fabrication of interconnects on these JIG's.

We appointed a dedicated supervisor (Clive O'Hagan) and a crew who's' sole responsibility now is the fabrication/Testing and qualification of interconnects.

What we achieved - results

We now have what resembles a production line when it comes to fabricating the Dry Etch interconnects. From delivering the pipework to bending it, installing on JIG, welding it and pressure testing it is the essence of LEAN Construction!

We have not missed any dates and in some cases completing SL2 Construction Finish at SL1 stage. Our productivity on interconnects has improved by 30%. Moral among all our men is on a high!

Jonathon Couch Construction Manager



NO. 6 - BRACKET INSTALL PROCESS IMPROVEMENTS

What we were doing in F14 – the need for change

In F14TI all primary brackets were dimensioned using the surface of the grid column in the subfab. This method was not applicable as all columns on site were twisted and misaligned with the columns in the model. All measurements taken from the surface of the columns were inaccurate resulting in a substantial quantity of clashes and rework. All primary brackets for tool install had to be set out using a total station resulting in a substantially longer install time. All goal post brackets in the fab had to be re-cut to accommodate for the uneven floor level. This resulted in a longer install time as large guantities of material had to be scrapped and reworked

Changes that we made

Introduction of reference lines to bracket packs. This was achieved by co-ordination between the BIM and survey teams to eliminate the need to dimension using the surface of the columns. Dimensions were now taken using a gridline network of control points set out by the survey team on site. The new control points were located on the structural steel in the subfab which can be relied upon for dimensional accuracy. Fitters can attach a laser level to the control points generating a reference line which is represented in the bracket packs. All brackets are now set out using these reference lines. We designed and fabricated a new type of adjustable bracket which allowed for floor discrepancies.

What we achieved - results

All brackets are now installed using a more efficient and accurate install process with no dependency on brackets being set out by the survey team. When brackets were spot checked using a total station, they were found to be installed mm perfect.

All goal post brackets in the fab are now adjustable with a 30mm tolerance to allow the goal post bracket to be adjusted up or down to accommodate for discrepancies in the floor.

The success from making these changes has been monumental. We estimate that the new processes in place, from set out to install, has delivered an estimated 75% productivity improvement for the bracket install team.

Brendan Spillane *Project Engineer*

NO. 7 - WASTE WALKS

Waste Walks' are now a vital tool to JEG for exploring the principles of Lean and the language of waste. By carrying out regular waste walks we are striving to build up an intolerance of waste among JEG personnel. The walks create a structured and ongoing approach to look at our operations and processes to identify waste. JEG conduct weekly 'Waste Walks' across all areas of our works at Intel. JEG Management and supervision are assigned various tasks and processes to observe each week and to report back in a systematic way on the different types of waste observed and the actions required to eliminate the observed waste. It involves being at the workplace and directly observing work as it takes place. It is dedicated time each week focused entirely on waste elimination.

The results to date have been very positive, the steps being taken each week to identify and eliminate waste from our processes are making incremental improvements to our productivity onsite every week. We will continue with Waste Walks with the goal to build up an intolerance of waste in every JEG employee.

Peter Cooney Project Manager

NO. 8 - SITE SURVEY & SET OUT

What we were doing in F14 – the need for change

Previously, Set-Out was made against columns, floors, and ceilings. This method was faulty for a number of reasons; Propagated errors from civil construction into the Fit Out process, the actual column locations misaligned with design locations by up to 150mm, columns leaned or twisted by up to 50mm, the references used were never intended for Tool Install activities. These faults resulted in countless delays, reworks, clashes and disputes.

Changes that we made

Introduction of the latest survey technology, a Total Station, allowed a dedicated survey team to carry out 'High Precision Set-Out' surveys. These surveys can work to a tolerance of ± 1.5 mm. Advancing on this, a customised 'Gridline Network' was set out. and communicated to BIM for application to drawings. This network allows the 'Fitter' to carry out the Set-Out from precisely located reference lines, placed at convenient locations throughout the work area (Geo-Block). All installations are then checked by an expert team of qualified surveyors.

What we achieved - results

The advanced Set-Out procedure resulted in vast improvement in positional aspect of Fit-Out process. The Gridline Network allows the 'Fitter' to accurately position their work, in turn speeding up the installation process. A dedicated survey team has ensured that all installations are installed within tolerance. Set-Out against High Precision Gridlines resulted in; Faster Installation, Less Reworks, Fewer Clashes, Fewer Disputes. A very successful undertaking!

Rob Hughes

Survey Manager

NO. 9 - WELDING PURGE PROCESS IMPROVEMENT

How the idea came about.

The schedule as it stood in WW29, JEG were going to need an additional 45 Argon purge panels to meet the following four weeks prefac start dates on tool install. Intel had neither the panels available nor the budget to supply them. We had to think of a leaner approach to purging high purity lines to overcome the problem.

Intel had already made the decision, due to the excessive quantities of Argon being consumed on site, to change the procedure as to how to build HP lines under purge on tool installs. The new process was to turn on a flow of Argon to HP lines during





the welding stage of the line only, and then isolate the Argon supply at the catwalk level and double bag the end of the line. This procedure would continue to be used on the lines for the prefac duration of the particular tool install prefac dates. This new procedure reduced the amount of Argon consumption being used on site, but the requirement for a purge line to be installed for each individual line, and an Argon panel for every five purge lines still remained the same from the first day of prefac start to SL1/SL2 construction finish for each tool.

With the above procedure in place, needing Argon only to be available for welding, JEG came up with the solution to remove requirement of all purge lines and approximately 60% Argon panels for the Tool prefac durations and in turn supply 40ft HP flexi hoses to our welders to hook onto the nearest available Argon panel and use this hose to transfer from line to line as they are welded. This will eliminate the need for multiple panels and purge lines during the prefac stage of tool install which ranges from 4 to 10 weeks. This idea will reduce the amount of argon panels required

and the quantity of purge lines being left installed in the subfab for prolonged durations. Hopefully this idea will be rolled out across the VF as a new procedure, as on this project alone the estimated cost savings are significant.

Warren Baird Construction Manager

NO. 10 - LOGISTICAL IMPROVEMENTS

What we were doing in F14 – the need for change

During Fab14 foremen would walk across to our stores in Collinstown when they needed additional materials, advise stores of requirements, wait for materials to be picked from the stores and either carry materials back to site or wait for the next available truck to bring materials back down to site.

Changes that we made

A material requisition form was created that is completed by the foremen in the field and scanned from the subfab scanners direct to the stores by 5pm each day. A stores nightshift was introduced who pick the materials from the stores and bag it ready for delivery to site the next morning. The materials are then delivered to site for 8am each morning and dedicated site personnel take delivery of the materials at site and distribute to the foremen.

What we achieved - results

Eliminated the need for the foremen to leave the site to get material thus ensuring they are available in the field at all times. The stores nightshift allows all materials to be ready for delivery to site first thing the next morning thus maximising our opportunity to achieve just in time deliveries and reducing our site storage needs. Dedicated site personnel to take delivery of materials minimises the number of men standing at the loading dock waiting for deliveries and streamlines the delivery process.

Colm Maher, Project Manager

NO. 11 - PVDF INSTALLATION CONTROLS

What we were doing in F14 – the need for change

The PVDF pipework was prefabricated direct from the Isometrics and then sent to site when called for by the tool foreman and installed by each tool crew. As a result there was alot of field clashes discovered only when the crew tried to install the pipework resulting in the pipework having to be sent back to the cleanroom fab shop in Collinstown for reworks and then sent to site a second time for installation.

Changes that we made

A dedicated PVDF crew was established to install all PVDF pipework across all functional areas. 2 men are dedicated to redlining the pipework just prior to the required installation date. The pipework is then fabricated and installed by a dedicated PVDF crew within 48 hours of completion of the redline.

What we achieved - results

Minimised any chance of the pipework requiring reworks as it is now installed within 48 hours of it being redlined in the field. The dedicated PVDF installation crew has resulted in a huge reduction in punchlist items as they are 100% familiar with the required specifications and best installation practises for PVDF.

Colm Maher, Project Manager



NO. 12 - THE "LEAN TIMES" NEWSLETTER

Our weekly newsletter 'The Lean Times' was developed onsite to communicate the Lean message to all JEG personnel onsite. It is seen as an effective tool to help share the newly acquired knowledge by management and supervision with every level within our organisation. Each week there is a two page article on the principles and background of Lean and how it can be applied in our day to day tasks. The topics vary from waste elimination to Lean principles to the effects of change, all written in jargon free every day language. The newsletter is also used to announce the weekly winners of the 'A Better Way' programme. The winning suggestions that will be implemented by JEG management are described along with the predicted productivity gains. It also outlines the reasons why a lot of the received suggestions cannot be implemented. In it's short publication history, 'The Lean Times' has proven to be an important line of communication to reach all crew members. The newsletter is designed and run by Ray Curley, JEG's Lean Developer on the Intel site but is open to all who feel strongly enough about a subject to put pen to paper and submit an article.

Peter Cooney Project Manager

WW36 WINNER

04

Last week we had a huge response to the " A Better Way" suggestion program. We had 23 suggestion acids collected from the boxes. All of these were reviewed and at useds/y Waster meeting it was agreed by all present that one of them deserved a (200 worker. Seven1 others, although they ddn't prove to increase productivity will receive a breaktast voucher for their participation and initiative.



Group E-mailing When sending a group e-mail please consider who you are sending it to. Ohly send it to be people who who are to see to. With this in mind the IT opport meth takes when sending group e-mails and if somore else neeks when sending group e-mails and if anyone else neeks when sending group e-mails and if anyone else neeks when sending group e-mails and if drives on group e-mails and if dri

" A Better Way " suggestion program. 22 people submitted suggestion cards in the boxes. This shows us the interest the crews have in making the project better and more productive plus receiving awards for their efforts. At Tuesday's Waste meeting a unanimous decision was reached that one suggestion was beneficial to the project and would save time and increase productivity. This sugges tion came from Mick Finnegan. Mick's suggestion was' " When gas-sticks are red they should be brought to site and the driver should have a sign-out sheet or book with him so they can be signed for on site by supervisor, not in Collinstow

Last week we had a huge response to the

LEAN Times

WEEKLY UPDATE OF JEG LEAN INFORMATION

Weekly Winner Group e-mail addresses If it ain't broke

This Issue

" A Better Way

" A Better Way "

This will cut out the need for supervision having to travel to Collinstown to sign out gas sticks and then have to wait for them to arrive. From now on, the supervisor will request gas sticks on the Material request form and scan it from the subfab to the stores. The truck driver will be issued the sticks with a sign-out sheet. Before the truck leaves the stores the driver will radio the supervisor and tell him his sticks are on the way. The supervisor will then meet the driver at the agreed point and sign for and receive his gas sticks. Congratulations to Mick.



October 2014

Issue 7

16

Seven in a row. WW42 produced yet another €100 winner. That's the seventh week in a row you've come up with "A Better Way" of doing our job and making life much easier for us all.



WEEKLY UPDATE OF JEG LEAN INFORMATION

This Issue " A Better Way " Weekly Winner Principles for Lean Success

LEAN Times

" A Better Way "

Congratulations to Mr. A.G.Hogg, this week's winner of the "A Better Way" suggestion program. Tony's plan has potential to make huge savings on time lost running temporary purge lines into the Fab during tie-ins to VMB's or gas boxes. Instead of installing temporary purge lines and then having to de-install them again after the tie-in, Tony suggested the use of a small portable gas cylinder, that can be stored in the Fab, to purge the lines. This will eliminate the time lost installing and deinstalling temporary lines. Super idea that will increase productivity immensely. Above Tony is presented with his prize by Ben Hunter (QA; dept.).



Boys to Men

Two Stalwarts of JEG, John McHugh and Jon Couch celebrating 25 years service with H.A.O'NEIL.



The picture above left shows John and Jon in 1989 at the start of their apprenticeship on the IFSC. The two lads have come a long way since then, they have risen through the ranks and are now both Construction Managers. John McHugh's success is down to his "Quiet Man" approach and Couchie strived on the "Tarantino" method. Between the two of them is a wealth of experience and they have been a part of all the bigger projects the company has taken on over the past quarter of a century. Best wishes and congratulations to the two lads on reaching this milestone in their careers and here's looking to the future.







Measure progress and remedy issues

LAST PLANNER TRAINING

The Last Planner System (LPS) is a planning, monitoring and control system that follows lean construction principles such as Just-In-Time delivery, value stream mapping (VSM) and Pull Planning processes. It is the project delivery system practised by the Lean Construction Institute worldwide and in the summer of 2014 it landed with a bang on the Leixlip campus. Intel, with the help of DPS and 'Lean Project Consulting' invested heavily in their trade partners to deliver a quality training programme designed to train all site supervision and management from every company onsite in the use of the LPS and the philosophy of Lean. In JEG alone, 44No. Supervisors, foreman, engineers and managers have completed the training and received their certificates. Bravo Intel.

The LPS has been in use now for several months and is still very much a work in progress. We have a long way to go to perfect it's use but the evidence suggests that it is working. Workflow is more reliable than previously, there are less constraints raised at the last minute and almost all milestones are being met or exceeded. It has definitely been a contributor to the vast change in project performance since F14TI.

Peter Cooney *Project Manager*

STEP 7 'A BETTER WAY' EMPLOYEE SUGGESTION PROGRAMME



Following on from the Jones Engineering Group's in-house Lean training an employee suggestion program was created. The goal of this program is to "help reduce waste and get Lean ". Here the crew members are encouraged to come up with better ways of doing their daily tasks, and hence the name of the program is "A Better Way". We mounted three post boxes with suggestion cards

around the subfab and one in our own workshop. Every Friday the cards are collected and at the company Waste meeting on Tuesday the cards are read out and discussed by management and supervision. If there is a unanimous decision that a suggestion, if implemented, will increase productivity and reduce waste, Jones engineering Group will reward the person who came up with the idea with a gift voucher. Since the start of the program there has been eleven winners. There have been over 200 cards collected from the boxes. Every one of the suggestions is recorded on a log along with the reason why it is rewarded, rejected or open for review. There has also been several winners that received vouchers for suggestions, that although they won't increase productivity directly, they are beneficial to the crews. One such suggestion was to supply posters showing specialist fittings to the crews in the subfab to stop confusion with descriptions of such fittings, eg; Swagelok, Entegris, Parker

Pictured, is an example of a suggestion winner that is being used on a daily basis. Sean Kearney developed a template for installing chemical line interconnects on the Wet Etch tools. By colour coding pop-outs and displaying line



numbers with POC's on chemical VMB's, the risk of crossing lines or connecting to the wrong POC is eliminated. Each row on the template corresponds with the POC's on top of the VMB. Here Seàn could see how easy a line could be crossed and by putting on his thinking cap he came up with "A Better Way" of doing a task that is being done every day. Simple idea, yet hugely effective.

Increasing productivity, reducing waste is what the "A Better Way " program is all about. Another classic example of experience being expressed came when Joe Glennon filled out his card and put it in the box. Joe could see many hours being wasted when testing 8LMP pipework. Several hours per tool were being lost by stripping out the Vendor spools and valves and then having to re-instate them on the Ebara pumps.

Joe suggested testing against the gate valve, using the 1" port above the valve as the test point, (as per image shown right).The valve default position is closed when no power is available. The test is carried out for SL1 before power is energised to the pump rack.

All joints on the line are tested. Joe's plan eliminates the need to call a crew back two additional times to carry out work on a line that is construction complete. This shows the belief Jones Engineering Group has in it's staff and their commitment to listen and implement ideas from everyone in the company. In order to communicate information and feedback to the crews regarding the " A Better Way " suggestion program a weekly publication called LEAN Times is distributed every Thursday. Here the winners are announced and how JEG

are going to implement their suggestions is explained. The newsletter also publishes articles on LEAN, prints several random suggestion cards and explains reason why they are or are not successful.

Ray Curley *Lean Development*



STEP 8 INTEGRATED PROJECT DELIVERY JEG, INTEL, DPS SIGN IFOA

Integrated Project Delivery (IPD) is a collaborative project delivery approach that involves a more deliberate form of integration among project participants, including the owner, architect, engineer, and contractor. Although integrated project delivery, in concept, is not new, the current approach to formalizing the operational parameters through multi-party agreements, pooled risk and reward structures, and trustbased relational contracting are new applications to IPD.

The current form of IPD was born out of the general belief that traditional contracting approaches create barriers to collaboration, transparency and the trust needed to truly collaborate; hence the rise of the multi-party agreement. The intent of the multi-party agreement (IFOA) is to create a contractual vehicle that removes barriers to collaboration (i.e. blaming others, hiding contingency and the mentality of every company for itself). This form of contracting can only be created through the use of a multi-party agreement in which there is shared risk/reward pool.

Benefits of IPD

We think of ourselves, because we have skin in the game. We are a team of professionals that can realize the project vision, within your budget, while reducing strife, making the process easier and more enjoyable. We use a target cost method, so Value Engineering is not an afterthought, but is built in from the beginning. It's the way we do business.

Empower the Owner

We give you the Owner the tools to make sound judgments that assist in transforming vision into reality, all within budget. Removing traditional trade boundaries eliminates layers of complexity that add time and cost. When everyone's interests are aligned, ideas flow freely and the stress of decision making disappears.

Incentivize Lower Project Cost

Sophisticated Owners and developers recognize traditional project delivery methods do little to incentivize lower projects costs. Our unique cost sharing arrangements allow shared savings, the more we save you the owner, the more we all profit.

Transparency Throughout the Process

Team members share ideas, costs, and profits. No hidden agendas. Information flows without layered hang-ups or mark-ups. Better decisions. Better project.

No Hand Offs or Knowledge Dumps

When Architects, Engineers, and Contractors are involved from the



start, Owner priorities don't get lost in translation. From Concept to Construction, one IPD team.

Value: Time Savings, Better Quality, Less Risk

If it doesn't add value we don't do it. Wring out the wasted steps and overlapping processes. Work with experts from the start, eliminate barriers, make reliable promises, and watch your projects evolve quicker, better, and safer.

IPD BENEFITS

- Empower the Owner
- Incentivizes Lower Project Cost

- Transparent Process
- Added Value: Time, Quality, Less Risk
- Less Strife
- Reduced Cost
- Reduced Timelines
- Shared Ideals and Goals
- Extreme Flexibility
- No Hidden Costs
- No Hidden Agendas

Using the IFOA (Integrated Form of Agreement) has proved a powerful way for projects to re-enforce Lean thinking throughout project lifecycle internationally. Jones Engineering Group are committed to engaging collaboratively using the IFOA to drive waste out of projects.

The IFOA allows for transparent information sharing and awareness of cost which encourages each stakeholder to think of each other as customers.

It also allows for the synergy required to deliver marked changes and waste reduction throughout a project thus allowing a value added environment to flourish.

Kevin White Contracts Manager

STEP 9

FUTURE

The P127X TI Project set out on a path to challenge the status quo and deliver change and innovation based on the background of lean construction techniques, partnering and teamwork across the project team, in order to establish a platform for delivering a successful project.

The project strategy and initiatives introduced by Jones Engineering are viewed as a model of success in team working and delivering best value..

This project has produced a significant step-change in the way our construction projects operate and is at the forefront in setting new standards for all existing and future projects. Redefining roles and responsibilities will mean increased interaction between team members, staff training and the use of project tools such as, Last Planner System (LPS), Lean Principles and value engineering will be encouraged to maximise value gains.

The objective is to instill Lean practices, principles, behaviors and a mindset from management through operations and into delivery, that brings greater value to the client. Embedding this culture will be achieved by working collaboratively, with like-minded people in a team environment with a shared vision of continuous improvement. This cornerstone of our business will drive new solutions, increase offering in integrated services and will bring expectations of better and more demonstrable results. Critical success factors include:

- Designing it right first time to meet construction requirements.
- Understand the cost and whole life costing, and not be driven by price.

- Utilise knowledge and expertise
- Integrate the team, by working with end-to-end supply chain in an integrated manner.
- Measure performance, to include 360 degrees reporting on your own input
- Up-skilling & Training
- Off site prefabrication and multiskilling
- Benchmarking performance
- Supplier development.

Brendan McAtamney Contracts Manager

LEAN CONSTRUCTION

BRIGHT FUTURE



joneseng.com