

COMPANY OVERVIEW



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Advanced Facilities business provides end-to-end client solutions for highly specialised facilities around the world. Our clients consistently receive accolades for our designs of pharmaceutical plants, research and development laboratories, and data centers. Significant projects include the world’s largest bulk biopharma modular plant in Singapore, the fastest bulk biologics facility built from concept to licensure in Ireland, and the world’s largest biotech campus project currently being built in Switzerland. Our technical knowledge allows us to meet the challenging demands our clients face to deliver products that make people’s lives better.

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OVERVIEW OF THE LEAN INITIATIVE

This case examines the application of Lean in an Engineering Services Provider (ESP) team on sustaining capital projects in Ireland with a total installed cost (TIC) of €500k to €10M.



Figure 1. Project Environment.

BACKGROUND TO THE LEAN INITIATIVE

The application of Lean principles provides enhanced value to the customer through a process of identification and elimination of waste. Jacobs has a well-established history of providing its clients with Lean project delivery that extends throughout the project life cycle, from design to construction, to commissioning and verification. Lean project delivery within Jacobs has also extended outside of the traditional engineering offices and into the client site-based Engineering Service Provider (ESP) teams. This case study describes the Lean tools and methods used in an ESP team at a Jacobs Client site, and describes how these have been applied to demonstrate value to the Client and drive cost savings.



Figure 2. Jacobs Team Collaboration.

LEAN INITIATIVE UNDERTAKEN – LEAN THINKING, TOOLS, TECHNIQUES

The history of this Lean journey stemmed from a desire to challenge and alter more traditional methods of reporting information within the organisation’s reporting structure and to provide real value to the Client. These traditional methods were seen to be ad hoc and fragmented as they often were non-standardised and sometimes did not align with the overall Client metrics or key performance indicators (KPIs). At the formation of the ESP team at the Client site, Jacobs established a different approach to these traditional methods of reporting information by applying Lean tools and methodologies to the methods of managing and reporting on a portfolio of capital projects.

This case study describes how these Lean tools and methods have been used within an ESP team to drive a high performance environment and value to the Client, cost savings for the Client and to the engineering firm, as well as supporting a culture of continuous improvement.

The first initiative undertaken was to develop new KPIs specifically to monitor the team’s performance and adherence to the site standards. The ESP team’s KPIs would closely align with the Client site KPIs, and this provided a single, efficient, and transparent means of reporting project statistics and status up through the Client organisation’s reporting structure.

Following the development of the new aligned KPIs, standardised reporting templates were designed to accompany each KPI and provide a means of visually and graphically representing the essential information that needed to be reported. Ownership and terms of reference were identified for each of the reporting templates. Meeting structures were defined with the Client with the view to specifically allow easy transfer of information through the Client organisation’s management structure. This started with daily and weekly ESP team meetings similar to operation meetings that might

be seen in manufacturing sites. These meetings were designed to feed information into higher level management reporting meetings, and the visual aids were designed in such a way that they contain information that is relevant through the reporting structures without the need to be modified.



Figure 3. Project Status Boards Updated Weekly.

The visual aids cover all aspects of engineering design and project execution, including general items such as Cost, Safety and EHS, and Quality, in addition to more specific aids such as compliance metrics, training metrics, project action registers, adherence to planned vs action targets. Visual aids are electronically generated and are placed on whiteboards located in dedicated ‘whiteboard’ areas of meeting rooms or open corridors. The information in the visual aids is often manually updated during the week as the expectation is that the information is maintained ‘live’. Regular reporting meetings are held at the whiteboard area, and a high level of accountability is placed on the owners of the visual aids to provide an update at those meetings.

One of the main purposes of the ESP team is to provide engineering solutions for the Client, whether to solve problems or to make improvements. Multiple projects are often simultaneously executed. As well as developing visual aids to track metrics, the ESP team generated a standardised visual aid to provide information about the status of each individual current project. Each project reports on the same information, ranging from overall status, planned vs actual cost, schedule, construction status, start-up status, and risk. These visual aids clearly define those responsible and the target completion dates. The visual aid provides a very clear and easy way of representing all of this information in a concise and systematic manner.

These visual aids provide proven value-add (VA) to the Client and drive cost savings and continuous improvement. The placement of the visual aids at easily accessible locations, along with the regular reporting meeting format, encourages responsibility and accountability of project deliverables. Metrics clearly show project status and continuously challenge the ESP team to meet and better their objectives. Compared to the traditional less-structured approach of reporting information, these Lean tools and techniques minimise unnecessary repetition of information reported across organisations and focus the team to report on information that is relevant to the Client.

This Lean journey started with a meeting between the leaders of both the engineering firm and the Client site to define and agree the metrics and KPIs against which the ESP team would be assessed. The Client site had previously defined the KPIs that it reports up through its own organisation structure, and these formed an initial starting point for the exercise to define the new metrics and KPIs. Both firms wanted the ESP team’s KPIs and metrics to be aligned with the site KPIs, to show clearly the links and relationships of the KPIs, and to support the information flow from the ESP team to Client site as well as to the site management and beyond. For example, KPIs and metrics

that were related to the site quality metrics such as number of overdue CAPAs (Corrective Action Preventative Action) or change control were grouped with the site quality metrics. Similarly, safety metrics for the ESP team were also listed with the site safety metrics. Occasionally, and where it made sense, the ESP team provided information that fed into the site KPIs. This approach provided an aligned and well-defined structure for the reporting of the ESP team KPIs. The standard now is for KPIs and metrics to be presented on a whiteboard using standardised templates in which each ESP KPI is placed beneath its parent site KPI, clearly showing the links and relationships.

Once the KPIs and metrics had been agreed, standardised visual aids and templates were developed and designed to measure the performance of the ESP team against the KPIs. The requirement for the visual aids to be clear, concise, and have a simple reporting structure was identified. Both firms wanted the visual aids standardised on the same reporting styles and to ensure consistency across the various visual aid templates was maintained. The visual aid tools that were selected included simple traffic lights and charts to indicate current actual status against pre-defined categories, and detailed both actual and forecast information. A designated owner for each of the visual aids was identified – the owner being responsible for the KPI and for maintaining and updating the information shown on the visual aid. It is also the owner’s responsibility to bring the updated visual aid to the relevant reporting meetings, whether that be a daily whiteboard meeting or a weekly performance or operations meetings, as appropriate. In addition to KPIs and metrics, the use of A3s was promoted to report on individual project information. The A3s provide a structured approach to representing the current status of each project, but also planned versus actual cost, schedule, construction status, start-up status, and risk. Each project reports information using the same A3 template which focuses the reporting meetings onto these standardised categories.

KPI and metric reporting meeting structures were also defined at the outset by the ESP and Client team. Similar to what you can expect of an organisation chart, the meeting structure defined which meetings fed information into parent meetings so as to generate a clear line of communication. Standardised terms of references for each of the meetings were generated which indicated the purpose of the meeting, defined meeting outputs, attendees, and frequency. Meeting leaders and owners were also defined in the terms of reference, which also provided clear definitions of responsibility. Meeting calendars were established, and efforts were made to ensure that the ESP team meetings aligned in terms of timing with the Client reporting meetings. High expectations were placed on team members to attend the reporting meetings or send a delegate, and meeting attendees were required to bring with them the required information. This definition and agreement on responsibilities was critical to the success of the communication and flow of information through the meeting structures.

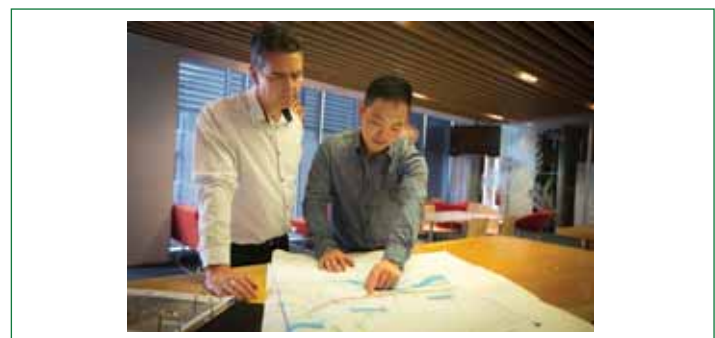


Figure 4. Team & Information Alignment

The Lean tools demonstrated in this example included KPIs, standardisation, and graphical representation for the visual aids and use of A3s. These Lean techniques had the combined effect of reducing waste that can often appear in a

traditional engineering context, and also assisted with the system created to report critical information from the ESP team up through the Client meeting structures.

LEAN INITIATIVE IMPROVEMENTS & IMPACT

The benefits of introducing these Lean tools into the ESP team has ultimately provided enhanced value to the Client by way of reduced engineering and construction contract costs, reduced waste, and efficiencies in the service provided. Each of the Lean tools described in this case study played its part in achieving these benefits. Information and metrics collected for the ESP team show there has been a continual gradual cost reduction in the engineering hours versus TIC since its formation. This trend provides a clear correlation between implementation and development of these and other Lean initiatives in providing enhanced value to the Client by way of cost reductions. The trend is accompanied by a corresponding increase in performance improvement through measurement of Quality Management System (QMS) scores, demonstrating a culture of continuous improvement overall.

Although the primary objective behind implementation of these Lean tools and methods was to provide cost savings and enhanced value to the Client, the reality is that this and other Lean initiatives provide much more to the organisation than purely the commercial aspects. In this example, the results of this initiative extended much further beyond the bottom line. Early agreement of the ESP team KPIs provided the basis for measuring the overall performance of the ESP team. The KPIs were directly focused and based on the Client site KPIs, and as such provided relevant and meaningful operational targets. Establishment of the relevant KPIs directly influenced the development of the other Lean tools shown in this case study, including visual aids, A3s, and standardisation. The strong focus on the KPIs also resulted in defining the ESP team meeting structures and the flow of information detailed elsewhere in the case study.

The strong adherence and accountability, to use the standardised visual aids to report information at meetings, coupled with the formalising of meeting structures and defined meeting terms of reference, has resulted in a shift in the mindsets of the team towards meeting etiquette. Nowadays, it is expected that the ESP team members arrive to meetings with the information they need to report, driving ownership and accountability for performance and results. This cultural shift has also influenced the team's attitude towards quality and compliance metrics, and the ESP team has used this to target year-on-year improvements. For example, closure of CAPAs and change controls on time is one of the metrics that has been measured since the formation of the ESP team. Continuous gradual improvements have been seen for this metric, such that now it is expected that 100% of change controls are closed by the due date. This is an example of where measuring relevant

KPIs can drive continuous improvement within an organisation and can result in a shift in behaviour to create new norms, embedding change into the normal every day.

Implementing Lean initiatives, such as this one, can be self-perpetuating. Continuous improvement is often considered as a journey that leads to further improvements and alters organisational thinking. In the case of the ESP team, continuous improvement and Lean strategies are now embedded into everyday tasks. Nowadays, Lean principles are inherent in all aspects of the ESP team, ranging from the organisational structure all the way through problem solving, idea generation, project delivery, and reporting.

However, this case study has also seen backward integration of the Lean tools and methods used by the ESP team towards the home engineering office. Early identification of project-specific KPIs is now common place and Quality and Compliance metrics now include a performance and delivery focus. Project reporting meeting structures have been refined, with clear lines of communication established. Projects have standardised the use of regular whiteboard meetings to review daily project deliverables, recognising that whiteboard meetings promote accountability from team members to meet scheduled deliverables. Standardised visual aids have also been introduced to routine project reporting meetings, including whiteboard meetings.

Furthermore, there have recently been moves to extend the implementation of these Lean tools and methodologies across other Jacobs ESP teams at other Client sites – clearly demonstrating a value beyond this particular Client project.

Some key initiative outcomes include:

- More than 16% decrease in engineering costs vs TIC cost from 2005 to date.
- More than 24% increase in Quality Management Systems (QMS) performance scores.



Figure 5. High Quality Delivery.