



Jones Engineering Group is a leading global, mechanical, electrical, and fire protection contractor operating in 14 countries across Europe and the Middle East. The original company was set up by Harry O’Neil in 1890 and, to this day, it has continued his vision of prioritising education, training, and innovation.

Over the last century, Jones Engineering has grown sustainably in both size and reputation, with a turnover of approx.

€700m and personnel of over 3,500 people worldwide.

Jones Engineering has been applying Lean principles for many years, and recognising the benefits it brings to the firm, our, clients and the industry as a whole. This commitment has fostered our dynamic, knowledge-driven, and customer-focused concentration on creating value-add and eliminating waste.

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Overview & Background to the Lean Initiative

Jones Engineering Services provide engineering maintenance services to our clients throughout Ireland. We offer a single source maintenance and asset care solution for facilities, covering all aspects of mechanical, electrical, fire protection, heavy lifting, and instrumentation across all sectors utilising a Computerised Maintenance Management Solution (CMMS) with a 24-hour helpdesk for more than 500 clients.

Our intention is to remain at the forefront of our industry by providing quality service within schedule and budgetary constraints, developing innovative systems and strategies for the future, and continuing to build upon the engineering and technical excellence which has long been associated with Jones Engineering.

With a large operation in a dynamic environment, flexibility in management and availability of resources is necessary for the delivery of maintenance services to customers with as little waste as possible.

At Jones Engineering, we recognise that the key behind Lean thinking is that service/maintenance department processes and client requirements are inseparable and complement each other to sustain the competitive edge of any organisation. To identify ways of improving the production process, we identified the 8 wastes of Lean Maintenance and Reliability and streamlined our CMMS system.

This eliminates processes that do not add value to the customer, inefficiencies in processes, and variations in the pace of services.

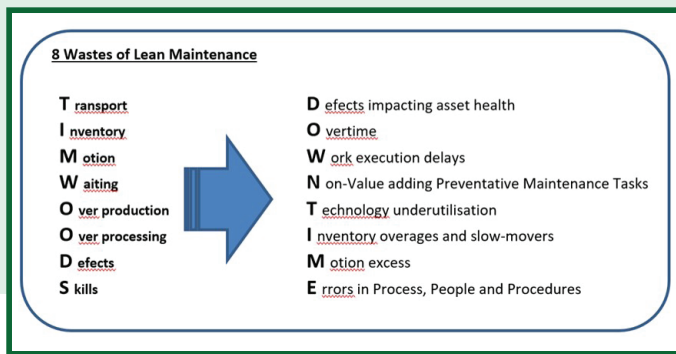


Figure 1. Jones Engineering Maintenance Services approach to Lean Waste Analysis

Lean Initiative Undertaken – Lean Thinking, Tools, Techniques

To incorporate Lean Maintenance techniques into Jones Engineering Services activity, a strategic approach to all processes was required to provide a more efficient service to our clients. We provide a streamlined solution to our partners in critical environments with unpredictable demands. Our daily challenge is to seamlessly juggle resources to suit fast-changing scenarios across a nationwide operation base, servicing Planned Preventative Maintenance (PPM), Reactive call-outs, and Minor works projects.

Meeting and demonstrating service level agreements (SLAs) to guarantee our clients' critical plant operations is managed through our CMMS. Each client site requires particular skillsets, with varying asset types from newly installed to end-of-life and beyond. Each client has different operational procedures and conditions that must be adhered to.

Lean Methodology

Applying the DMAIC (Define, Measure, Analyse, Improve, Control) methodology to analyse the processes involved on the CMMS is an effective method when applied to the process that designs or builds the product rather than looking at the product itself.

The define stage of DMAIC highlighted opportunities for improvement, current problems and the main aims and objectives of the process. It was defined that external inputs to the autonomous system were decreasing the output of each stage in the maintenance system, defined as the 8 wastes of Lean Maintenance ("DOWNTIME") affecting productivity and creating delays in the system flow.

Stakeholders & Benefits

The stakeholders included Jones Engineering Services clients, account managers, administration staff, subcontractors, and technicians. For the Lean initiative to be successful, all parties needed to buy into the initiative for the collective benefit of the stakeholders:

- Jones Engineering Services sought to improve its processes in relation to reducing: (i) Return calls to sites to carry out additional works resulting in increased costs; (ii) Downtime for technician's fault-finding due to lack of familiarity of sites and assets; (iii) Administration time spent on tasks due to repeat or inaccurate calls; (iv) Management of subcontractor reports and invoicing; and (v) Time spent inefficiently maintaining defective assets through life cycle costing analysis.

It was recognised that the CMMS knowledge available was required to flow to all levels of the process to eliminate any flaws in our procedures. Cutting out non-value-added tasks has given us a competitive edge and decreased engineering maintenance costs for our clients. We provide the service and assurance our clients require, that their plant is operating at its peak performance, saving on operating costs and downtime to their facility whilst guaranteeing compliance with standards.

The backbone of our service is our CMMS tailored to manage and record the flow of information from initial calls right through to asset reporting and analysis. This is available at a client's fingertips, eliminating historical practices when issuing folders and folders of paper reports was the norm.

The goal was to increase productivity by 10% within a calendar year.

Notable waste areas identified were:

- Time lost waiting for quotations and approval.
- Time lost to technician familiarity of previous asset history.
- Mis-directed calls – identifying operational issues.
- Call logging inefficiencies – missed phone calls, unread emails and sharing of information, familiarity of site.
- Delay in receiving sub-contractor reports resulting in delay of client reports.

- Clients would benefit from the process as they had easy access to the CMMS and their assets history with all the information available at their disposal to: (i) Reduce maintenance costs through operating efficiencies; (ii) Forecast annual budget costings; and (iii) Early failure warnings maximising their plant efficiency.
- Account managers gained a greater overall view of the status of contracts which resulted in less time dealing with non-productive issues and reduced administration workload, with increased efficiencies allowing staff to hit realistic targets and enabling enhanced job satisfaction.
- Sub-contractors had the incentive of timely and transparent payment on receipt/upload of accurate reports.
- Technicians gained increased support and knowledge increasing outputs, job satisfaction, and a corresponding bonus scheme was introduced.

Deliverables

Process deliverables included time logs spent to monitor tasks from call logging to closing a call, new standard operating procedures (SOPs) for subcontractors, KPIs and collection of data collated by the CMMS.

Measures of Success

The Lean initiative was measured using CMMS data collected previously and comparing the real-time data along with projection to monitor improvement progress.

The data for the measure phase in terms of the calls and KPIs was readily available for assessment as the system logs all the information for extraction; however, a time log from an administration view was assessed over a 1-week period to measure time spent vs productivity

| Jones Engineering | | Time Log | | | | |
|-----------------------|--------|----------|-----------|----------|--------|--|
| Task | Monday | Tuesday | Wednesday | Thursday | Friday | |
| Assigning Technicians | 3 | 5 | 5 | 4 | 3 | |
| Chasing Reports | 5 | 3 | 6 | 5 | 4 | |
| Number of calls | 34 | 29 | 24 | 31 | 24 | |
| Breached Calls | 4 | 2 | 4 | 3 | 6 | |

Figure 2.
Sample Time Logs

Once the measurement data was defined, a number of graphs were produced as part of the analysis phase. Graphs identified a re-occurring trend daily with the same average number of calls dealt with by the helpdesk; an average of 4 hours per day assigning the technicians to calls and ensuring that there were available resources to assign to the calls; and over 5 hours per day following up reports. This meant that a number of calls that required attendance were missing SLAs as a result of assigning technicians.

It was found that the root cause of the calls missing SLAs was the inability to get in contact with the correct technician whilst the flow of information wasn't getting through the system quickly enough, and sending unfamiliar technicians to sites where specific skillsets were required, and underutilising the technology available.

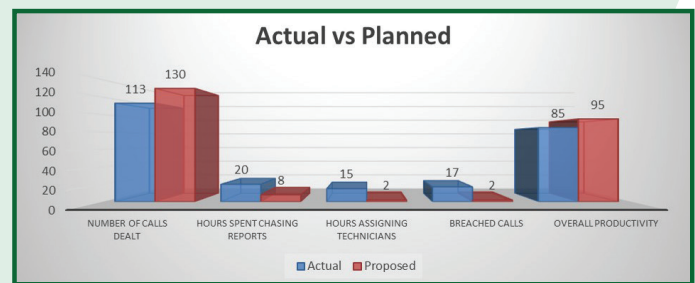


Figure 3.
Actual Weekly Average vs Planned

Lean Initiative Improvements & Impact

A team meeting was held amongst all stakeholders to suggest and implement improved strategies for the 8 wastes of Lean Maintenance as follows:

Defects impacting asset health

Life cycle costing analysis now allows clients to assess their overall costs with a repair or replace scenario using the history of their assets on the system. This eliminates time spent comparing and collating information from suppliers to compare the overall cost of disposal and purchase of new plant. The clients benefit from the application by ensuring their plant remains compliant whilst also assisting their financial planning. This tool implements a Lean maintenance focus to the client for proactive and predictive maintenance, as opposed to reactive maintenance, to ensure that their facility remains operationally efficient (Figure 4).

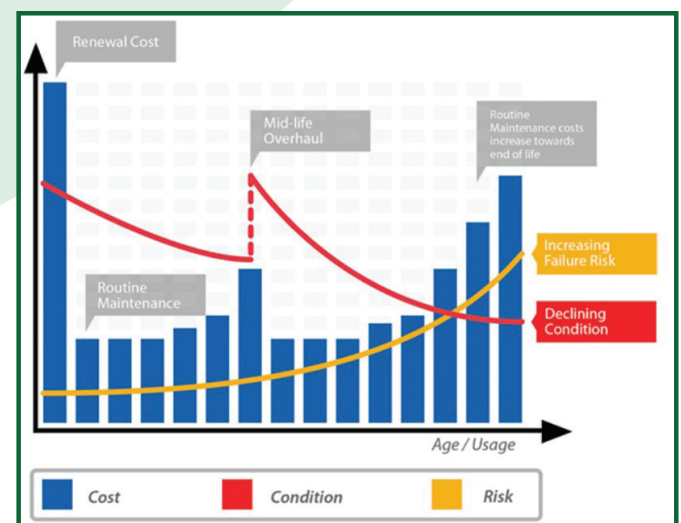


Figure 4.
Asset Life Cycle Costing Analysis

Overtime

The previous call history is made available to the technician’s phone through the CMMS for the site in order to verify previous asset history and monitor performance, thus eliminating time wasted re-diagnosing issues with assets. This eases the flow of information from technician to technician and allows access to see who last visited the site, thus removing time spent seeking previous site attendees.

Work execution delays

A quotation request function has been added to the CMMS system to enable the attending technician to send the necessary details of the task for swift costing to office staff. This also allows the technician full access on their mobile device to see if the call had been quoted for previously. This allows for approval while the technician remains on site eliminating the requirement for the technician to return, thus saving in time and additional costs to the client.

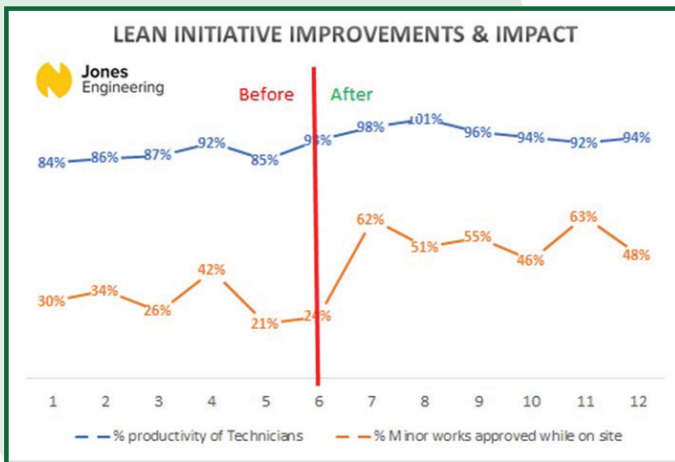


Figure 5. Jones Engineering Productivity & Efficiency Lean Improvement

Non-Value-Adding Preventative Maintenance Tasks

When logging a call out, an asset and site history function has been enabled on our CMMS to automatically display similar calls and to identify if reoccurring calls continue appearing, or to assist in diagnosing or resolving calls over the phone.

Technology underutilisation

The introduction of a client mobile app to allow the client to log a call on their mobile device, incorporating a picture of the plant/description of the problem which is then logged on the CMMS system, eliminates time wasted from the passing of information from the client to the helpdesk and on to the technician. The mobile app also allows client access to the reports in real-time for download and electronic sharing.

Inventory overages and slow-movers

A traffic light system was implemented on the call as an overall visual aid for the prioritisation of calls. The traffic light system would prove to be an early warning system that the call is about to breach an SLA. It highlights that the process has been affected in order to implement remedies for the process to be put back on track, thus increasing quality control.

Motion excess

A function was added to the CMMS so that when a client site is selected the system shows technicians’ locations on the basis of proximity and familiarity to the site. This allows for automatic selection of the technician by the system, thus reducing mobility times, reducing travel time and costs, and eliminating administration costs involved in phone calls trying to find a technician to attend.

Errors in Process, People and Procedures

A subcontractor portal has been incorporated into the CMMS wherein a subcontractor can log in to upload their reports to the appropriate call. This in turn triggers payment pre-approval for their invoices. It eliminates unnecessary time wasted on administration following up reports to add to the system and provides quicker visibility for our clients and account managers.