



**2020 CANADIAN CONSULTING
ENGINEERING AWARDS**

A Culture of Continuous Improvement

Submission Category:

Community Outreach & In-House Initiatives

Continuous Improvement Engages Employees, Generates Production Efficiencies

In late 2016, Arrow Engineering began engaging employees in a program of Continuous Improvement (CI) to change how the company operates daily. The program is organized around Lean management principles and is designed to ensure that employees at every level of the company consistently operate in a way that is driven by constant, ongoing improvement. Arrow employees do this by attending to specific process improvements: first identifying symptoms that point to process improvement opportunities, and then taking ownership for solving those problems to make both individual and the company's workflows more effective. As Lean trainer consultant Avel Espiritu suggests: "Improve your work while doing your work."

Formal training in Lean principles for every employee, as well as ongoing programs developed in-house to sustain and promote Lean methodologies for improvement, have created a culture at Arrow that mandates and implements critical engagement across the board – within the organization, with clients, and with project partners. Continuous Improvement at Arrow has made a significant and measurable difference, by enabling staff to continuously improve their ability to provide value for their customers at every step in the design and engineering process.

CI at Arrow is an umbrella concept, composed of the following three components:

1. The formal, classroom training in Lean systems: all employees receive technical training to the Yellow Belt level at minimum, and those interested in continuing, move forward to a Green Belt certification;
2. The Arrow Improvement Hour (AIH), a twice-monthly problem-solving work session in which all employees participate; and
3. The Arrow Client Experience (ACE), a recently implemented Feedback Program that provides an embedded link in employees' email signatures to facilitate helpful feedback as a matter of course, with documented communication.

Spearheading these programs is Chief Performance Officer (CPO), Robin Reid, P. Eng., the human face of the company's commitment to the Lean CI model. His sole responsibility is to ensure that the company and its employees stay on track with the details and the responsibilities that the program entails.

Since the initial implementation in early 2017, this culture of continuous improvement has grown to now inform all the company's activities, internal and external, formal and informal. The approach has proven to be self-reinforcing – successes within the context of the CI framework have led to further acceptance of the program among employees, higher engagement and participation in the process, and more positive outcomes. The Lean thinking model, as applied within the organization, has led employees to apply these values in the design and delivery of their projects: personal responsibility, critical engagement, and acceptance of change as a fundamental aspect of commerce in the 21st century.

This dynamic component of the program has been key to building a flexible problem-solving approach directly into the Arrow service model. It is imperative that the company pivot to successfully meet the changing nature of clients' design specifications and project goals. As CPO Robin Reid notes: "Understanding and implementing these principles and practices has created a culture of continuous improvement at Arrow, and it is something we are very proud of. It makes us flexible, collaborative, innovative and nimble. It helps us to be able to explore and predict project challenges with an open mind, regardless of where the best solution comes from. It makes us a great part of a team, because we do it every day in our office."

What began initially as a top-down training mandate in Lean, has transformed into broad acceptance of the approach throughout the organization and has become a grass-roots protocol of critical engagement reflected at every level of the organization. The focus on problem-identification and problem-solving by individual employees has highlighted and enabled the fundamental linkages between personal responsibility and value. This leads to cost and time efficiencies for Arrow and their clients as an outcome of increased personal effectiveness throughout an employee's work flow.

Innovation From The Inside Out

Lean methodologies based on the Toyota Production System (TPS) provide the core principles that drive the CI process at Arrow. The CI process is inherently innovative insofar as it is focused on productive change – think of it as process design. Lean practices in the manufacturing and other sectors has become quite common. Arrow sought to apply it in a design and consulting setting, and in a region (Alberta) that tends to operate in peaks and valleys and often shies away from serious engagement with, and implementation of, Lean principles.

These process changes happen at the individual level as an outcome of an employee's critical analysis of their current workflow to eliminate wasteful steps or activities. By examining familiar tasks with the intent to improve them, then following through to realize the improvement, employees learn to apply these lessons to more complex, and/or less obvious tasks, making innovation a fundamental aspect of all their activities. Saving time by refining a step, even incrementally, improves the process.

This adds value for the client by minimizing time invested, thus making billable hours more effective, and enhancing profitability for clients, contracting partners, and Arrow itself.

Intentional steps to implement these Lean methodologies through a formal Lean training program for all employees requires significant innovation at the organizational level. Refinement of internal processes increases the cost effectiveness of all hours worked, including those that are billed. Over time the small improvements add up, particularly as processes that affect multiple employees over multiple similar projects are refined. The paradoxical twist is that by investing time to improve employee effectiveness, the organization is ultimately rewarded by tremendous time savings and greater cost effectiveness overall.

A Culture Of Innovation Drives External Success

As the following graphic indicates, the construction sector trends on the slow side as an adopter of process innovation to enhance individual productivity. Arrow's Lean Trainer, Avel Espiritu, notes: "In the engineering industry we've "leaned" towards technologies like CAD and BIM software. This has led to huge gains in efficiency of producing drawings but hasn't sustained in reducing design errors or improving constructability in a design/build project. Improving collaboration and coordination between projects teams and implementing ways to flow information or "value" between design partners has led to improvements in the industry."



Economist.com

Arrow stands out for bucking this trend with a formal commitment to the CI process as a rigorous effort to create an internal culture that addresses the very problem that prompts many construction firms to avoid internal organizational development. As CPO Robin Reid notes, quoting Tom Northrup: “All organizations are perfectly designed to get the results they are now getting. If we want different results, we must change the way we do things’. This is where Arrow shines; we have always driven at the heart of change and innovation, and we have seen the need for our focus to adapt as we’ve grown. Arrow invests heavily in our people to create a sustainable culture of innovation and change, such that we all become comfortable with the discomfort of change.” By committing to continuous improvement, the company makes intentional change fundamental to their organizational culture. Thus, when the unexpected pivots arise in the course of a project, Arrow’s employees understand how to make those changes with grace and purpose.

As noted earlier, a culture of personal responsibility grows from the compounded actions of engaged personnel at every level from grass roots to the executive suite. It is up to company leadership, however, to formalize a commitment to CI across the organization by implementing programmatic changes.

Arrow leadership has done this by taking the following actions:

The company has made the financial commitment to engage Lean training provided by Red-5 Lean Performance (led by Avel Espiritu) to train all staff. The program consists of a full-day introductory course and demonstration experiment, followed by 24 hours of classroom-directed research, reading and discussion distributed over a period of 10 weeks. During classroom sessions, staff work with real-world exercises involving problem-solving scenarios from active Arrow projects. When training is complete, staff have earned their “Yellow Belt”. To date, 93 staff have been trained.

For staff that show a high level of desire to further their Lean training, the more advanced “Green Belt” designation is offered. Thus far, 17 Arrow staff members have earned Green Belts. Green Belt status involves learning to apply Lean principles to more difficult, complex or convoluted challenges, especially where there may not be a clear solution path. The “A3” process (named after the metric equivalent of a 11”x17” size paper, on which the specific problem and solutions are tracked) teaches the aspiring Green Belt to “go slow to go fast”. It does so by presenting a specific problem-solving approach focused on a root-cause analysis and honest exchange among stakeholders as to the current state of the solution vs. what will ultimately need to happen – identifying the steps to get from here to there. The deep understanding of the problem, shared among stakeholders, leads to a solution that addresses the problem itself rather than superfluous features of the problem - thereby minimizing wasted time and effort.

Engaged, honest dialogue among problem-solvers enables a shared sense of purpose and goals. Practice doing this enables greater facilitation with complete disclosure and responsibility on the part of the team members – great training for difficult conversations downstream with external stakeholders. In

recognition of Arrow's successful implementation of Lean methodologies, Mr. Espiritu made the following comment: "The biggest change I have seen in Arrow is less reaction, and more responsiveness. Something as simple as building a room follows steps, each step in the operation involves another organization, and the complexity and variability of the problems increase exponentially.

Striving towards a learning organization allows a team to navigate these intricate challenges and address the root cause of the problem."

In addition to classroom training in Lean methods, each staff member performs what is called a "Waste Walk", to identify any elements of waste produced through processes. Staff then have the opportunity to complete a "5S" process where they Sort, Set in Order, Shine, Standardize, then Sustain one area or process at Arrow. A 5S is never complete, hence the term "continuous".

One key in-house effort to formalize the CI process is the Corporate Initiatives program, wherein each employee identifies a problem and takes the "initiative" to resolve it, with time set aside intentionally for the employee to commit to the effort. A working definition of Initiative from CPO Reid: "A planned and scheduled change that we estimate and believe will create a positive and beneficial impact to Arrow, our culture, our people, and especially our clients".

Initiatives fall into one of three categories from within the Lean methodologies:

1. 5S, as described above, these are often ongoing; there are currently 40 active 5S Initiatives.
2. Kaizen, (Japanese for "change for the better", freely translated as "improvement" in English), single-event changes with a relatively clear path to solution. There are currently 26 active Kaizens, with 16 resolved this past year.
3. A3, as described above, for changes of a larger nature that may be challenging to resolve; there are currently 36 active A3s.

Each Initiative is shared with the rest of the organization on Arrow's Continuous Improvement board, displayed in an open office area. Employees report on their Initiative progress during the bi-weekly Arrow Improvement Hour. Every employee is expected to engage in at least one Initiative. Company leadership analyzes and tracks the specific ROI for each initiative, providing support and resources to the employee as required.

Another important improvement theme for the Arrow team is that of effectiveness, in addition to efficiency. Quoting Peter Drucker: "Efficiency is doing things right; effectiveness is doing the right things". Arrow prefers to focus on doing things that are the right things; the things that drive value for their clients. Again, regardless of how efficiently tasks are executed, the time is wasted if they are, in the end, the wrong tasks. This is a message that is reiterated frequently as part of the company's CI programming.

Another clear indicator of the company's commitment to CI is the simple fact that they have retained a Professional Engineer and Project Manager, Robin Reid, as their Chief Performance Officer. As a Project Manager, Reid led the charge for process improvements in addition to delivering projects for his clients, with the support of strategic services including IT, marketing and human resources (HR). Recognizing his enthusiasm through the initial implementation of CI, the transition to full time CPO was a natural step to further Arrow's productivity goals. His job is exclusively focused on helping the company and its staff add value to all their activities through a variety of development efforts, including ongoing guidance of the CI process and Lean for employees. The fact that he has the credentials and training of a Professional Engineer is notable and makes him more relatable to our staff.

Robin's regular responsibilities are akin to project management, supporting employees in the completion of their Initiatives. This includes meeting with them, guiding them to resources, even assisting with implementation for any overextended employees that request assistance. In addition to working with all staff to support their Initiatives, he attends meetings with senior management to ensure that the direction and energy for CI programming connects the hierarchies working at the top and the bottom of the org chart; he is the key link in the process. He also provides support and guidance to company leadership as they strategize and manage innovations in the ongoing CI process.

As noted above, for the past year, at bi-weekly intervals on Friday mornings, the company takes the time to gather as a collective and work through their Initiatives, highlight specific achievements and accomplishments of individuals or other noteworthy events. This is called the Arrow Improvement Hour (AIH), and it has become a fixture on the group's collective schedule for improvement work, problem-solving and time spent together as a team. Though it may seem to be a simple matter on the surface – getting together to talk – detaching all employees, many of them engineers, from their daily work is not a trivial matter. It is, however, another sign of the commitment that individuals, as well as company leadership, have taken to support the concrete realities of collective, continuous improvement for everybody on the Arrow team, as individuals and as a group. The AIH provides staff with a good opportunity to bounce ideas around to solve challenging matters in a structured setting.

A final, recent example of the company's formal commitment to CI comes in the form of the Arrow Customer Experience feedback link. ACE is a hyperlink embedded within the email signature file of every employee with the company. It enables the external message recipient (typically a client) to provide immediate feedback to the company. It is an attempt to open clearer, more immediate lines of communication among stakeholders, internal and external to the organization.

Internal Investments Reap Long-Term ROI

By minimizing waste, by solving process problems internally, and by improving the cost effectiveness of every hour that is billed to a client, as well as those hours that are not; the employees at Arrow are investing their time and intellectual capital in a system that works smarter, not just harder. It stands to reason that this investment will reap rewards both financially, with a greater ROI for Arrow and for its clients, and organizationally, with higher levels of satisfaction among employees, creating a more stable and sustainable organization. A more stable organization is a more consistently productive organization. Trust is increased at every level.

Staff retention is also improved through consistent application of CI. When the program started, head count was at 77, now it is at 96 as work has increased. Recruitment efforts, too, feature the CI / Lean process as an incentive for signing on with Arrow. Potential employees, as well as active staff, recognize the value of the Lean training and the company-wide engagement that such an approach entails. CI engagement, as manifest by participation in the ongoing Lean programs, is also an aspect of an employee's performance review. CI is literally built into the fabric of Arrow culture and performance, reflecting the confidence that management has in the business case for such improved internal practices.

Mr. Espiritu notes: "As we face more disruptions and distractions in our work and society, we can't solve these with technology or even processes. Our people is what will solve these. Those organizations that empower their people to be problem solvers and constant learners, will be the ones that will come ahead in any scenario or new approach." Developing a staff of trained problem solvers not only enhances an organizations problem-solving ability, it develops a problem-identification ability as well. Root-cause analysis and honest dialogue among stakeholders saves time and money by helping Arrow and its clients avoid and/or minimize problems from the outset.

These organizational efficiencies are not easy or inexpensive to realize. It is a case of modest pain and expense now, such as the costs of training 93 people in a classroom setting – not simply the cost of the classes, but the opportunity cost of that time away from the desk and the salaries that must be paid throughout the training. For example, classroom time alone for Yellow Belt achievers is 10 weeks of in-class training, research and practice – that is a real time commitment for 93 Yellow Belt employees.

For Green Belts, the classroom time is an additional 20-30 hours. Nonetheless, those investments since 2017 are paying off as Arrow has increased market share through production efficiency; simply put - Arrow achieves more with less hours of effort.

Timeline Extends Indefinitely

The timeline for the project began in Q4 of 2016, when CPO Robin Reid received his initial exposure to Lean with Avel Espiritu in the A3 problem solving methodology. In Q1 of 2017, Arrow leadership committed to training all staff from White Belt through Yellow Belt level, then advancing 16 of those Yellow Belts to Green Belt (Robin had achieved his Green Belt in the initial training round). Then, in Q3 of 2018, the second round of Lean training with all new staff commenced from White through Yellow Belt; this round was completed in Q2 of 2019.

Training is ongoing for Green Belt (A3) methodologies for those newer Yellow Belts that display the highest levels of drive and engagement in innovation at Arrow. Further training will continue as needed at all 3 belt levels: White (introductory training for everyone), Yellow (for everyone after probationary acceptance – 93 and counting), and Green (28 total to date).

Internal Engagement For External Traction

As noted previously, Arrow's engaged CI process is driven by both internal and external stakeholders, identifying and resolving problems on behalf of both parties. Using the Initiatives program as an example, problem-solving for a client or project identifies a pain point in the company itself. Each of the 96 current employees is involved in at least one Initiative that entails eliminating a pain point, with a total of 126 current Initiatives (active or planned). As those Initiatives are resolved, that learning remains within the Arrow organization. The internal and external are always connected. As Mr. Espiritu notes: "Root-cause analysis forces companies to unravel these complex and varied issues to discover the opportunities for sustained improvement that lasts beyond the current scope of the project."

What makes the CI approach at Arrow particularly effective, however, is that, by regularly attending to internal bottlenecks and frictions, the Arrow team receives constant practice and refinement of their problem resolution skills and is always prepared to dive in to help clients. They are problem-solving athletes, always in training. Finding solutions is not a rarefied exercise, it is the fabric of their daily lives.

Insofar as CI is a matter of course for the company, Arrow staff are not shy to discuss their approach with clientele. While they don't evangelize per se, their enthusiasm for their skill set and their pride in their process can lead to in-depth discussions and follow-up meetings with clients regarding "how we do it".

This works for Arrow, as they strive to drive positive change in the local industry by offering a positive and effective role model for problem solving, collaboration, and other kinds of stakeholder engagement. Internal abilities to identify potential problems that were previously unacknowledged or otherwise unrealized, have emerged, reshaping their ability to problem-solve with and on behalf of

clientele. This has resulted in the resolution of not only current project-related design issues, but residual and backlogged problems as well.

As CPO Reid notes: “At Arrow, we take on the challenge of this endless pursuit, looking to our clients to guide our steps. We actively solicit feedback, then capture and act on it. We process it in a way that creates and sustains real change in our organization, so that we can continue to have a positive impact, both in our client relationships and directly on their projects.”

Success Defined By Meeting New Challenges

Arrow defines the success of this project by their increased ability to address new challenges on behalf of their clientele, as well as, within their own organization. CI is, by its very nature, an open-ended project with no ultimate resolution. With the identification and subsequent elimination of each pain point, or wasted motion, on the path towards cost-effectiveness, Arrow can celebrate an interim victory. Once the confetti has settled, the organization must internalize the learning inherent in the success and move to the next, as one success often leads directly to the next challenge.

Has the program been successfully implemented? – definitely. Internal to Arrow, the CI program has been exceptionally well implemented: 93 employees formally trained to various levels of Lean methodologies; over 25% of those moving into more advanced training; broad acceptance and participation in the Arrow Improvement Hour; overall engagement of company leadership as well as the rank and file in the Initiative program; ongoing development of new CI projects, such as the new feedback program (ACE). All the formal steps in support of the broad CI initiative are off to a great start.

Externally, Arrow’s clients remain enthusiastic about the work we do on their behalf, and the resolution of their problems within budget and on time. It is a challenge to judge an internal program like this through direct metrics; clients tend to be unconcerned with internal processes, and every project is different which makes comparatives difficult. As noted above, if Arrow can lead by example and provide useful support to project stakeholders, that must be counted as a win for CI, as it informs all our actions.

Informally, the implementation appears solid and continues to generate internal momentum. The new culture of change has taught all the participants how to handle constructive feedback; at Arrow we consider feedback to be a gift. A basic tenet of Lean is respect for all people, hence personal development has been a key outcome of the project. Feedback is a focus on process improvement, though it is often a roundabout way of essentially working on personal development – helping the person learn and improve by focusing on making their process more effective. By keeping the intent of the program focused on both personal improvement and process improvement, CI elevates both.

CPO Robin Reid states it most clearly: “To summarize, our transformation has impacted every facet of our work by refining our approach to problem solving; it is deeply rooted in our culture and therefore our daily practices. We enjoy and pride ourselves in leveraging the Lean training that we each receive at Arrow, for the betterment of ourselves and our processes.”

He continues, “Being a stable, growth-oriented Building Engineering Services provider means that we work tirelessly to deliver the best possible value to our clients in a sustainable and cost-effective manner. We want our clients to get what they pay for and our improvement efforts are focused specifically on this goal. Arrow’s Continuous Improvement program provides both the foundation and framework to ensure that we can continue to provide this level of service. We are certain that it will continue to improve well into the future.”