

From Desire to Discipline: The Evolution of Oxbow's Continuous Improvement Program

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Abstract

This paper gives a case history and future vision of Oxbow's Process Improvement Program (acronymized as *Pip*) - a pragmatic, inclusive system for continuous improvement across industrial plants, terminals, and corporate hubs. The initiative began with conventional approaches, like Lean and Six Sigma training followed by structured projects, but those attempts failed to take hold. Common complaints encountered were complicated tools, lack of support, and no time/budget. From seasoned colleagues, the all too familiar phrase, "*we tried this before and it never worked*" was not uncommon. Therefore, we reframed improvement around frontline issues, minimized the tool burden, and sought out immediate wins. Rather than creating a program and rolling it out, we used an agile approach, we built upon the success we encountered, which eventually self-institutionalized into a program accepted by all. A key focus was on people, defining value first as what is perceived by employees, and then refined by management to advance true north objectives. The result is an operating habit, not a campaign, where we have a quarterly company-wide forum with leadership feedback, visible recognition, and a credible training pathway. Nearly 2,000 projects have been logged, and more than 200 formal presentations have been given. Ground level staff and senior leadership routinely are engaged in an open forum spanning multiple countries.

Understanding that new challenges are inevitable to sustain competitive edge, *Pip* continually reflects on its successes and failures, and updates mission objectives and tasks to maintain effectiveness and relevance. These will be discussed in the latter section.

Keywords

Organizational Culture, Agile Change Management, Lean Six Sigma, Operational Excellence

1. Introduction

Continuous improvement has its roots in early 20th-century quality thinking, particularly the work of Walter Shewhart (1939) and later W. Edwards Deming (1982), who emphasized managing and improving processes through iterative learning rather than relying on end-product inspection. Deming's Plan-Do-Check-Act (PDCA) cycle framed improvement as an ongoing, systematic activity embedded in daily operations. These ideas strongly influenced post-war industrial practices, especially Toyota's Total Quality Management (Ohno 1988) and Japanese "kaizen". When ISO developed the ISO 9000 family of quality management standards, in 1987, it codified these proven principles. Over successive revisions, especially from ISO 9001:2000 onward, continual improvement became an explicit, core requirement of ISO-based management systems.

Even with such a sound base, many continuous improvement programs struggle to achieve adoption and sustainment once they leave the slide deck. The reasons are rarely a lack of intent or intelligence, but often due to application. Training programs tend to provide details on how a tool is used in one industry but do not do a great job of describing how to adapt it for the needs of the business in question. Programs get overly involved in procedures, guidelines, and policies, but things like variability in equipment, local priorities, and constraints create a perception of mismatch

between generic processes/toolkits and the realities of actual work. These issues conspire to slow momentum, or worse, halt it.

The Oxbow *Pip* Continuous Improvement program was designed to invert the above pattern. Rather than dictate a procedure, *Pip* opened by asking people to make something, anything, better, as they saw fit. Then it supplied just-enough method and coaching to effect that change and share it with others. All wins were celebrated. Staff became motivated to expand their scope, gain more training, and make impacts that are palpable to senior management

This paper gives a narrative of Oxbow's *Pip* Continuous Improvement, from creation, to where it is now, and where it may take our organization in the future

2. *Pip* Origins

At Oxbow we started our continuous improvement by investing in standard Lean and Six Sigma classes. Then we asked the trained staff to apply the skills. The author was part of the initial batch and can share that while all the attendees were generally engaged in the class activities, and all completed green belt certifications, it was still very difficult to relate course content with most of our processes. Further exacerbating the situation, while the instructors gave detailed descriptions of textbook examples, many of our use cases did not conform to those examples, so they struggled to explain how the tools applied to us. Some attendees related this experience to initiatives at their previous organizations, where similar training and certifications lead to paper qualifications but no benefits, and eventually died.

A common complaint related to the continuous nature of our processes. Most Lean and Six Sigma tools have their base in discrete batch settings, stemming from the types of industry from where the tools originated. Oxbow operate high temperature continuous furnaces. The large thermal inertia of such processes means that changes have variable response times, making cause and effect relationships difficult to discern. Instructors struggled to explain how Lean and Six Sigma are applied to such cases, largely because not every Green Belt instructor is aware of time series analysis such as auto-correlation models (Box et al, 2015).

Even with the challenges encountered in class, there was a general desire to improve. As such, we took a step back to gain more insight into continuous improvement. This included the author getting further training into Lean, Six Sigma, Project Management and Agile.

3. *Pip* Evolution

3.1 Key Early Lessons

The advanced training occurred over a couple of years, and it was complemented with practice. Here are the key lessons learned:

1. It takes time to fully understand the various tools, methods, etc. so there is a period before benefits are seen. As such the senior management team must have patience to effectively pursue effective change.
2. On completing any training, whether it is Lean, Six Sigma, or Project Management, the tools learned should be used. Now, this does not mean they should be used exactly as taught, but an attempt must be made with the understanding that most likely it will not be perfect. Just as future Olympians practice their sport, the Continuous Improvement practitioner will need to practice using the tools they have learned through application and trial and error.
3. It is more important to understand the intent of a tool, than to understand than the method of using it. The reason is because the tool must create value, and there is no value in lengthy and pedantic procedures when the tool is not doing anything for the organization. Once the intent is understood, then the correct tool to address real life issues can be applied.
4. While all programs stress the importance of clearly defining success first, we opted to define success in a fuzzy manner. Early on we realized when an organization is new to Continuous Improvement, goals are not clearly understood. Most of the time, people are just trying to address the job at hand, whether it is a reaction to an event (e.g. a breakdown or change in deadline), or just a large To-Do list. Neither are floor supervisors often thinking

of strategic goals, but rather they are keeping the business-as-usual machine working. As such spending days with various management levels to define goals that are aligned with corporate strategy and then identifying metrics to track those goals can be a long, cumbersome effort with little reward, and perhaps lead to skepticism by staff. Therefore, we started by asking staff to make a change, any change, that they believe helped their jobs. Once we allowed people to change for the better, then we began to introduce strategic change objectives.

3.2 Program Growth

Once we asked employees to come up with ideas to make their lives better, the program gained traction. By accepting any change, staff started to present their ideas to supervisors, managers, and their colleagues. No project was judged to be inadequate. Staff became engaged in generating ideas, and presenting them in group settings, something that many felt they never had the opportunity to do previously.

Our initial procedure simply consisted of logging ideas, getting supervisor approval, and then working on them. This allowed supervisors the ability to redirect effort if they believed a different direction was needed. Having completed a batch of projects, select ones were presented in a group setting, of about 10-15 people. Four facilities and corporate departments were represented. We exchanged ideas, challenges, and built team rapport. After a few meetings, management recognized the benefit for this type of cross facility collaboration, and requested quarterly meetings. The quarterly forum soon followed a process, including a safety moment, management insights, and one or two presentations from each facility.

The desire for increased participation led to establishing virtual meetings, which also reduced travel costs. After about 20 meetings, 3 additional facilities joined, and occasionally corporate departments such as finance and IT presented their projects. Furthermore, AI-assisted captions and translation in Microsoft Teams further improved access for facilities in non-English-speaking countries during live sessions.

3.3 Recognition

Early in the program we realized that the *Pip* program gave an opportunity for talented staff to demonstrate their abilities. Therefore, management could scout for top performers. However, we also realized that a promising employee may not have the opportunity to or understand the benefit of presenting. To address this, *Pip* instituted an award system for the winners. The awards provided incentive for staff and plant management to come up with their best projects, and presenters. We also ensured the same person was not always the winner, to encourage broad participation.

The award system consists of a trophy for the best project. The winners hold onto the trophy until the next meeting, so the trophy travels from plant to plant depending on the winner. We also recognize good projects in specific areas, such as safety, innovation, and teamwork. Those winners have their names engraved on perpetual plaques. We have identical perpetual plaques at all locations so the name of a winner from one facility is on the plaques at all the other facilities, which gives the winners recognition throughout Oxbow.

3.4 The Training Element

While one individual can make excellent improvements, an effective organization needs every individual to continually improve. To aid this, we devised a training program that provided effective training in key improvement tools. In order to counter the negative experiences of previous lean and six sigma training programs, *Pip* training is focused on needs and results, with projects incorporated into it. Furthermore, it has three levels, so each person can participate and still gain skills without completing the whole course.

Pip Level 1 provides a background to continuous improvement principles, and certain skills to analyze work processes, and look analytically at data. It has 6 modules, and each is provided during a lunch and learn setting to maintain two-way engagement, with participants discussing their challenges, and the instructor tailoring the message accordingly.

Level 1 modules are:

- Module 1: Introduction: What is improvement?
- Module 2: Basic tools to brainstorm, assess workflows, and make decisions based on sound evidence
- Module 3: Data and Information: How is information derived from data?
- Module 4: Measurement Systems: How accurate do we need to be?
- Module 5: Experimentation: Introducing the concept of hypothesis testing
- Module 6: Sustaining Change: How not to go back to the old ways

Individuals that desire more knowledge and skills are referred to LSU's (Louisiana State University in Baton Rouge, LA, USA) Continuing education department, where courses in Lean Six Sigma, and/or Project Management are offered. On completion of the LSU coursework, which leads to a green belt or project management certification, Level 2 is complete.

Level 3 training was developed in conjunction with LSU, and leads to joint certification with them, and so it is transferable. The joint certification includes completing a project where continuous improvement tools are used to create value for Oxbow. The tools can be Lean, Six Sigma, or Project Management. The project is evaluated by an Oxbow instructor and LSU instructor. The project is deemed acceptable if the tools are used effectively to make decisions and, ultimately, create value. The value may be financial, risk reduction, or strategic, so an economic analysis is not always necessary.

The Oxbow/LSU joint credential with LSU aligns with their broader alternative-credential movement discussed by Verma and Box (2023)

5. Program Management – Be Agile

5.1 Be Agile

To manage the program, *Pip* experimented with leadership meetings, and steering committees with the intent to set direction, align resources, etc. It soon became apparent that *Pip*'s achievements already surpassed many of management's expectations. These included communication across multiple operating plants, idea sharing to arrive at better solutions, and enhanced presentation skills. In fact, it became common for new ideas to be approved by VPs during group meetings, and for successful projects to be adopted at sister locations (the concept of *Yokoten*).

The program created a professional awakening of numerous employees. Reserved staff sometimes delivered high impact projects, and when management validated their benefits, their confidence grew. Subsequently, as they continued to work well, these staff were rewarded with larger roles within Oxbow.

With these excellent outcomes, *Pip* could have easily become complacent and cemented itself. However, management took the initiative to let the practitioners explore new horizons, to explore new ways to improve, especially with the ever-changing challenges of business. Program management therefore took on an agile nature, whereby benefits were realized, and then further investment (mainly in effort) was made towards the next value proposition.

The *Pip* program expanded to explore new business and product ideas, as well as bring in new talent to further fine tune the operations where it started from. Section 6 expands on the future direction.

5.2 The Role of Lean and Six Sigma

Since *Pip* did not follow the traditional path of a Lean Six Sigma program, one may question if and how Lean and Six Sigma fit into *Pip*, or even if they are still relevant. The answer to the latter is an unequivocal yes. While the scope of the current paper does not include a detailed explanation of this issue, a brief one will be given.

Traditional Lean training may follow the tool set in the House of Lean, with tools such as Eight Wastes, or 5S. But who wants to hear what they have been carefully doing in their job is potentially a "waste", or a "non-value added" step? That description may put off even the keenest employee. Instead, *Pip* focused on the key principles, such as respect & support for others, reducing stress, and contemplating change.

Six Sigma is about consistency or delivering repeatable and desirable outcomes at scale. We say an undesirable outcome, e.g. an out-of-spec or unforeseen issue, is caused by a combination of factors. The cause-and-effect relationship is quickly converted to a mathematical/statistical problem, such as $Y = fn(x_1, x_2, x_3, \dots, x_n)$, where the effect Y is the results of a combinations of causes $x_1, x_2, x_3, \dots, x_n$. Our challenge becomes to determine the right hand side of the equation, or determine $fn(x_1, x_2, x_3, \dots, x_n)$.

The two challenges seen were, first, there are people who dislike math, so they are already lost. Second, statistical analysis is not straightforward. The former challenge is best addressed by matching people's skills with their jobs. The latter challenge means further training.

Pip limited statistical analysis to only those individuals who wanted it. The master black belt supported more complex projects, and conducted deeper analysis as needed. While this does limit the work everyone can do, it has not restricted the flow of improvement ideas, yet.

6. Vision 2030

Now that *Pip* has given us an improvement mindset, where do we take it next? And, furthermore, we have a new player in the game, AI. How does AI fit in? What is the guiding light we can turn to? The answer lies in one of the tools used early on any Lean or Six Sigma analysis, Voice of the customer (VOC). VOC is the key to unlocking the path forward.

As mentioned in Section 2, before the development of the *Pip* training modules, external instructors gave Oxbow employees textbook methodologies but were not able to directly apply them to our type of manufacturing environment. The instructors were not focused on the voice of THEIR customer, Oxbow! The key to success in transformational Continuous Improvement and Quality programs is the Voice of the Customer. As continuous improvement leaders we are tasked not only to keep our external customers but more importantly our internal customers happy. This fundamental approach must not be forgotten, and often requires soft skills as well as technical ones. Today, since technical and analytical tools are rapidly supported by AI, we need to equip our teams with additional soft-skill tools that compliment AI so they can work in harmony with it.

The vision was developed by interviewing staff at all locations to understand their challenges and listening to their wish list. Interestingly, but perhaps not unsurprisingly, we heard about the desire to minimize unplanned activities, be they equipment, process, or people related. As such, we used the Root Cause Analysis tool (typically used in maintenance) to understand the issues and minimize or eliminate them.

6.1 *Pip* Future Vision

Step 1: Address today's challenges - Develop Root Cause Analysis (RCA) methods and Facilitators

The plan is to develop a Root Cause Analysis Facilitator Program that focuses on addressing the hidden issues facing our employees. We observe that people are busy doing the necessary and we want to create more time for them to do the important. In talking with staff we often heard “we need more data to decide to what to do.”, which seemed to create decision-paralysis, and employee confusion, with employees overly engaged in data gathering, without understanding the value of their actions.

The foundational methodology to address the above is RCA via a systematic process such as 8D Problem Solving, but tailored for the current need. The program creates a Facilitator to host, lead and moderate improvement efforts. Just like a gracious host can encourage a dinner table to keep the tone of a conversation amicable, the RCA facilitator should foster an environment that encourages respectful collaboration and innovative problem solving. They should monitor the conversations and ensure that ideas are not shut down before full scrutiny and that no strong personality dominates the conversation. They should skillfully see the innate traits of the team members and use that to assign roles that make best use of their abilities. They should also be able to avoid conflict to keep teams comfortable.

Pip aims to develop a team of 5 or 6 RCA facilitators to independently drive investigations based on recurrent issues. AI will be a powerful tool used to automate documentation, verify logic of arguments, find hidden patterns in data or evidence, and flag issues to investigate not easily caught by humans.

In addition, RCA Facilitator implementation has many Organizational Benefits. It ensures individuals are accountable, and that RCA is effective in addressing today's issues. The program also distributes responsibility of RCA leadership among a group, so workload is balanced, as well as skill development is spread evenly. Successful RCAs result in stronger groups and a sense of accomplishment, leading to team and people development.

In summary, the RCA Facilitator is the next strategic direction of *Pip*, so our employees are free to think of the future.

Step 2: Work Flows to create value-creation mindset

Once the RCA Facilitator culture and AI engagement matures within problem-solving teams, *Pip* shall transition to the next focus. While today we don't know what the specific focus is, *Pip*'s overall goal is empower teams to take a

functioning “good” process and make it “excellent”. No doubt, VOC will play an important role, as will new team, talent and technology.

Pip’s goal is to adapt as needed, but the key goals are to foster a strong communication pathway with the teams, clear roadblocks and streamline workflows.

Finally, since these two steps rely so heavily on team engagement, it is imperative to continue fostering a global Adapting to the new ISO 9001:2026 requirements and ISO/IEC 42001:2023. This topic will be further explored in a future paper.

7. Conclusion

In this case study, we attempted to illustrate how continuous improvement capability can be built and sustained in complex, continuous-process industrial environments, through pragmatic design rather than strict adherence to prescriptive frameworks. It has been a long journey, as illustrated on Figure 1, and it is not over yet. Our *Pip* program demonstrates that operational excellence is achieved by creating conditions that enable consistent problem identification (VOC), strong and open communication, and organizational learning at scale.

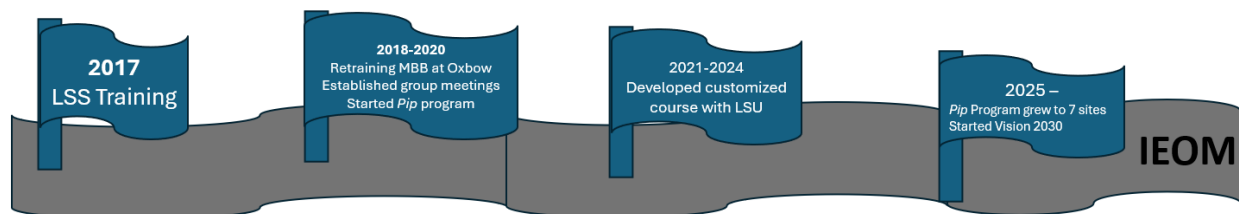


Figure 1. *Pip* Journey Summary Throughout the Years

Pip highlights several transferable best practices. First, improvement systems benefit from *progressive formalization*: allowing frontline-defined improvements to precede enterprise-level programs. Second, operational rigor can coexist with flexibility when governance focuses on cadence, visibility, and feedback rather than procedural compliance. Third, recognition systems that account for role, scope, and resource asymmetry reinforce fairness and broaden participation, strengthening the human system that underpins operational performance. Finally, tiered, application-driven training supports capability development while maintaining a clear line of sight to operational value.

The *Pip* experience reinforces a central theme of operations excellence: sustainable performance improvement emerges when technical methods, human behavior, and management systems are deliberately aligned. Rather than positioning Lean, Six Sigma, or Agile as ends in themselves, *Pip* integrates their underlying principles—flow, variation reduction, experimentation, and learning—into everyday operations. The result is a self-reinforcing improvement habit that scales across sites and functions while remaining resilient to changing business conditions.

For practitioners and researchers in industrial engineering and operations management, this case suggests that the effectiveness of continuous improvement programs should be evaluated not only by tool adoption or financial metrics, but by their ability to embed improvement into routine operational decision-making. *Pip*’s evolution demonstrates a viable pathway for organizations seeking operational excellence through inclusive, adaptive, and context-aware continuous improvement systems.

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Biographies

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Karla Gonzalez is Continuous Improvement Manager at Oxbow, where she leads the group initiative for improvement as well as specific high impact projects. She holds a Master of Science in Engineering Systems Management and a Bachelor of Science in Industrial Engineering from Texas A&M University, USA. She is a Six Sigma Green Belt. Her experience spans lean manufacturing, quality systems, supplier development, and data-driven operational excellence.