17 Ways Lean Manufacturing Increases Profits and Wins Bids

Lean manufacturing can have major benefits for precast and prestressed concrete manufacturers who put these tips in place.

idencia

Why We Love Lean

This report provides a top-line review of lean manufacturing practices and the benefit they can provide to the infrastructure manufacturing industry. It is written for concrete manufacturers but is applicable to any party in the infrastructure supply chain.

Idencia, Inc. is a software-as-a-service company, but we firmly believe that technology *itself* is not the means for improved productivity. Technology enables new workflows. New workflows are the real source of productivity gains.

Lean manufacturing practices, introduced in the 1950s by Toyota for automobile manufacturing, have since been applied in virtually every industry as workflow practices that improve productivity and increase customer satisfaction. New information technologies, particularly those that make possible the efficient collection and management of large amounts of data, create new possibilities for the application of lean manufacturing practices.

Technology enables new workflows, the real source of productivity gains.

The fundamental premise of lean manufacturing is that all activities should be concentrated in the value stream, defined as *only* those activities for which the customer would be willing to pay (more on this later). At Idencia, we believe that the customer value stream starts before the customer relationship, at our first touch with an industry member.

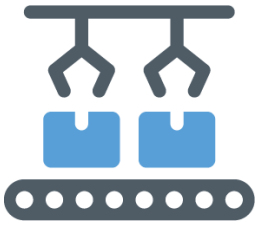
So, we offer this report to begin our value stream for the concrete manufacturing industry. We welcome the opportunity to pursue your lean journey with you.

The Power of Workflow

The Ford Story

The classic example of the power of workflow is Henry Ford's introduction of the assembly line process for manufacturing automobiles. When the conveyor belt was introduced in the late 1800s, it enabled manufacturing to occur systematically and efficiently. With this, Ford was able to introduce the assembly line process, lowering the cost of manufacturing and enabling scale.

By reducing the cost of manufacturing, Ford was able to lower his prices without impacting margins to a level that was affordable for the middle class. Prior to this, car ownership was a luxury only for the wealthy. By using the new technology of the day to create the assembly line, Ford was able to:



Lower the cost of manufacturing

Preserve company profit margins

Open a new market of middle class buyers

Increase production capacity

In the process, Ford applied one other very unconventional practice. He increased the wages he paid his people on the manufacturing line so that they could afford the cars he was making! As a result, the Ford Motor Company quickly became the dominant market leader in automobile manufacturing.

The lessons learned from Henry Ford's success apply today and, in fact, present more opportunities now than they did for him. Simply stated:

1. Constantly improve work flow for productivity and customer satisfaction
2. Look for technology solutions that enable workflow innovation
3. Think contrarian

Technology and Workflow

In some cases, technology enables a complete transformation of workflow that revolutionizes an industry... or industries. Ford's development of the assembly line transformed manufacturing in virtually every industry for most of the 20th century.

However, technology's impact on workflow is usually much more incremental. A good example of this is the change that word processing created in the work of a secretary.

Before the introduction of the personal computer (PC) in the early 1980s, most of the work a secretary performed was taking dictation, typing and then re-typing the edits that the boss made after reading the first draft. The introduction of the PC produced two changes that profoundly improved productivity in the office:

1. It allowed the boss to type his or her own document and make changes along the way. This substantially shortened the cycle time required to produce a typed document; and
2. It revamped and substantially upgraded the job of a secretary by eliminating much of the (boring) typing, replacing it with more stimulating work in assisting the boss with other matters. Today, the person formerly titled "Secretary" is called "Administrative Assistant" because the value provided is much greater than note-taking and typing.

The same scenario plays out in any situation where technology is introduced to automate the mundane. This certainly applies to the infrastructure supply chain:

- The quality control manager using information technology to capture QC records (instead of a clipboard) is no longer required to spend time preparing reports because they are automatically generated. This allows much more time to be applied to improving quality.
- The project owner that uses internet-of-things (IoT) technology to monitor the health of infrastructure changes, the nature of an inspector's work. The inspector now makes fewer inspections and applies time to investigating the most significant issues. The inspector can also recommend *predictive maintenance* based on analysis of the sensor data generated. In both cases, a much higher value use of an inspector's time.

Most of what follows will produce incremental workflow improvements rather than revolutionary changes. But, don't underestimate the exponential potential that can be realized by compounding incremental improvements throughout your manufacturing process.

LEAN PRINCIPLES

Lean Manufacturing Defined

What is Lean Manufacturing?

Lean manufacturing is a practice, not a system. It is often defined as the practice of continually improving workflow to reduce waste and focus activities on those that produce customer value. It is a mindset first and foremost.

Let's get started with some definitions:

Value Stream	The series of activities engaged by a vendor to create value for the customer.
Value Stream Mapping	Process of identifying (mapping) each step performed in the value stream. The process starts by defining the value the customer wants.
Flow	The sequential process of the Value Stream.
Constraints	Impediments to Flow.
Waste	Any action or resource commitment that does not directly contribute to the Value Stream. *Note: You will see that many actions considered necessary are actually waste because they do not contribute value to the customer.*
Pull	Demand from a customer that initiates the Value Stream process.

Lean manufacturing is a practice, not a system. It is a mindset first and foremost.

The Customer's Perspective

A lean practice requires that everything—**everything**—is considered from the customer's perspective. By "the customer" we don't mean the next party up the supply chain. We mean the party that is ultimately paying for the project. From this perspective, answers to the following questions need to be included in considering the delivery of value:

- How do we deliver value demanded by the customer?
- How do we deliver the product in sync with the customer's flow?
- How do we deliver services that the customer wants or might want?
- How do we continuously exceed the customer's quality standards?
- How do we deliver the product at the lowest possible cost?

Note that the answers to these questions are dynamic, not static. That is because these all describe the **value stream**, which is in a constant state of **flow**. They also make clear that the value stream should always be triggered and influenced by customer **pull**. Finally, all of this should be designed to happen with minimal **waste**.

Lean manufacturing is a practice, not a system, because it involves continual revision and rework as a matter of course. There is no end because there can always be more value added, more waste removed.

This is accomplished by routinely engaging in **value stream mapping** to determine:

- What value your customers demand
- What additional value can be offered
- Where waste can be eliminated
- Where **constraints** exist in your value stream
- How constraints can be minimized or eliminated

One of the great things about a lean practice is that much of the above can be addressed through innovation, not necessarily additional investment. This is why companies that practice lean manufacturing are generally the most innovative, and therefore market leaders.

By involving the entire staff during lean planning sessions, we find that:

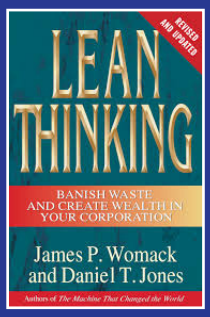
1. Everyone sees the big picture, crucial to coordinated company direction;
2. Everyone remains focused on the value stream and actively participates;
3. Everyone sees the perspective of others and their contributions to the value stream;
4. Constraints and waste are more easily identified with "fresh eyes" of others who are not involved in a particular activity on a day-to-day basis.

As a small company, it is more practical to meet on a weekly basis with the entire staff in comparison to a large company. In larger companies, the routine practice should be applied in smaller groups whose leaders then meet in similar fashion with each other.

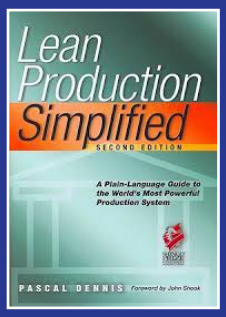
Resources

There are many good resources that address lean manufacturing practices in more detail and provide excellent examples. Here are some of the best to get you started:

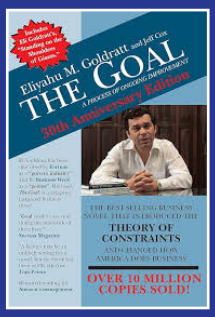
- Lean Enterprise Institute (LEI), a 501(c)(3) nonprofit with a mission to make things better through lean thinking and practice. Founded in 1997 by management expert James P. Womack, PhD, LEI conducts research, teaches educational workshops, publishes books and ebooks, runs conferences and shares practical information about lean thinking and practice. James Womack started the lean manufacturing movement in his work studying the Toyota Production System and advising US companies in the practices. He coined the term “lean manufacturing”.
- Planet Lean, the official online magazine of the Lean Global Network, a consortium of not-for-profit organizations dedicated to advancing lean thinking and practice throughout the world. The Lean Global Network was also founded by James Womack.



Lean Thinking, a primer on lean practices written by James Womack and Daniel Jones. This is a seminal book that is easy to read. Definitely the first book you want to purchase.



Lean Production Simplified, a hands-on guide to implementing lean practices by Dennis Pascal, a former manager at Toyota who applies his learning of the Toyota Production System.



The Goal, by Dr. Eliyahu M. Goldratt illustrates his Theory of Constraints. This book shows how to effectively minimize work-in-process and demonstrates how WIP is the greatest single source of waste.

Now that we’ve covered the basics, we’ll discuss the **17 ways that lean practices can improve profits and win bids for the concrete manufacturing industry**.

Value Stream Mapping

How Do We Create Value?

There are two primary phases in value stream mapping:

1. Determine the value that the customer wants.
2. Chart the steps involved in providing the customer value.

Let's look at a value stream map that is typical for many precast manufacturers:

Basic Value Stream for Precast Manufacturer

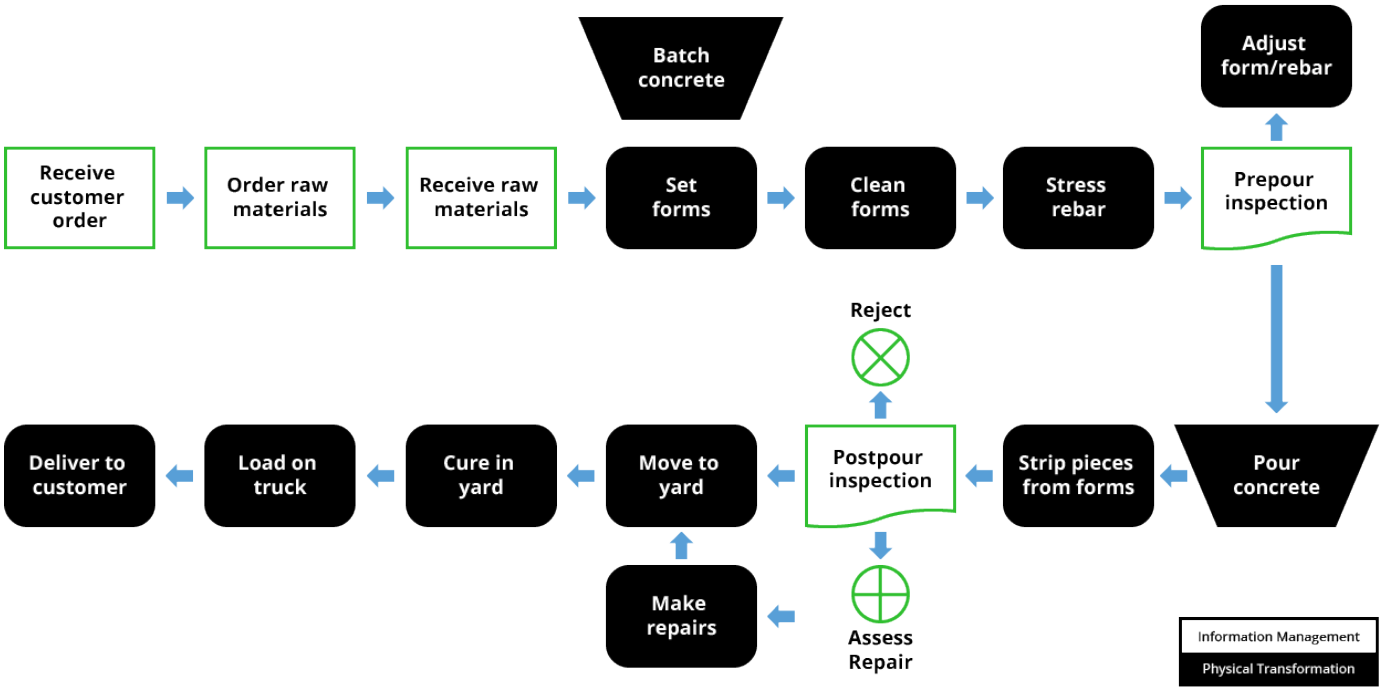


Figure 1

Addressing the first phase, determining the value a customer wants, is not as simple as the last step listed, "Deliver to Customer". Yes, the customer wants delivery of the product but what else provides *exactly* the value the customer wants?

- Delivery at a specific time?
- Delivery of the product configured to plug into the construction sequence?
- Delivery with QA documentation in electronic form?
- Prior to delivery, real-time updates on production status?
- Prior to delivery, the ability to change product spec or configuration?

These are phrased as questions because answers *only* come from a discussion with the customer about what is wanted. As previously mentioned, this requires understanding with *all* parties in the supply chain, not just the contractor to whom the product is delivered.

Determining the Value

Determining the value demanded by the customer is **the most important element** of lean practices. And, this is not a one-time process; it is an evolution. As your company engages in this practice you will see commonalities and trends occurring in the responses you receive. These can be incorporated into your value stream as standard practices. As you continue this practice, the value of your products will become greater and your company will be recognized as an innovative leader.

How does this practice of determining real customer value contribute to the 17 ways precast manufacturers can increase profits and win bids?

1. Additional features/services enable higher pricing.
2. Customer collaboration will reveal new product opportunities.
3. Solving customers' problems creates lasting affinity.
4. Your company will become branded as innovative.
5. Your company will quickly be recognized as an industry expert.
6. Your company will become branded as "easy to work with".

Once you have identified the real value demanded by the customer, you need to work backwards and map your value stream as we did in Figure 1, above. This allows you to:

- See every step in the value creation process
- Identify areas where additional value might be created
- Identify how we can most effectively operate in response to customer pull
- Identify waste in the process
- Identify constraints in the process that can be subsequently addressed

This is also where we can identify how technology might be applied to enhance the customer experience. For instance:

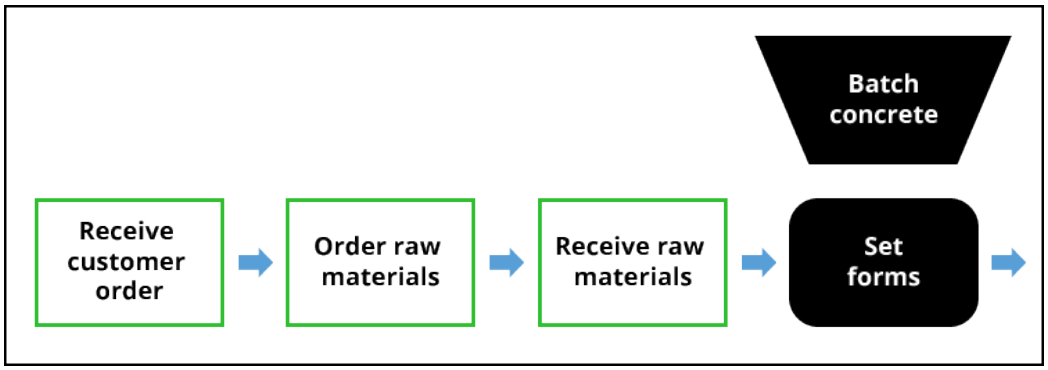


Figure 2

In the early part of the value stream, can we:

- Offer customers electronic order entry?
- Provide customers with an electronic interface to check production status?
- Provide customers with an electronic interface for change orders?

And later in the value stream, does the customer want electronic access to the QA reports that are produced by the post-pour inspection process?

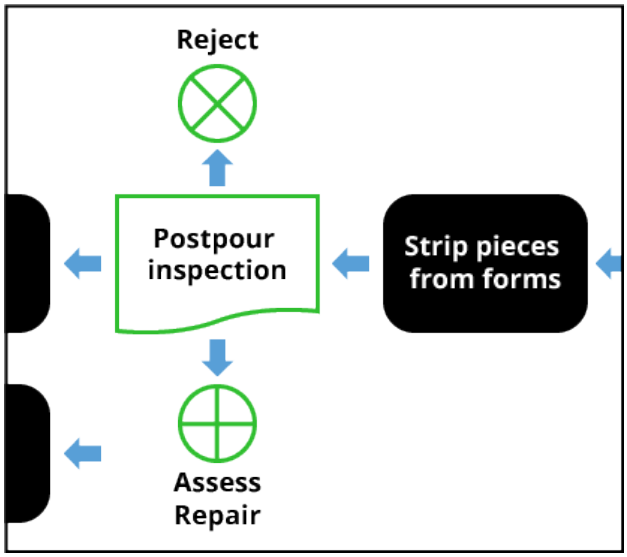


Figure 3

How does mapping the value stream contribute to the 17 ways precast manufacturers can increase profits and win bids?

1. You can make your customer more efficient.
2. You can identify services that complement the product offering.
3. You can enable your customer experience to be seamless.

As we will discuss next, mapping the value stream also highlights efficiency that we can produce by identifying waste and reducing constraints.

Waste

Drag and Opportunity

Waste is simultaneously the largest drag on most companies and the biggest opportunity for quick returns from implementing lean practices. There are two basic elements of waste:

1. Repetitive or unnecessary use of resources.
2. Necessary use of resources that do not contribute to customer value.

Waste in Value Stream for Precast Manufacturer

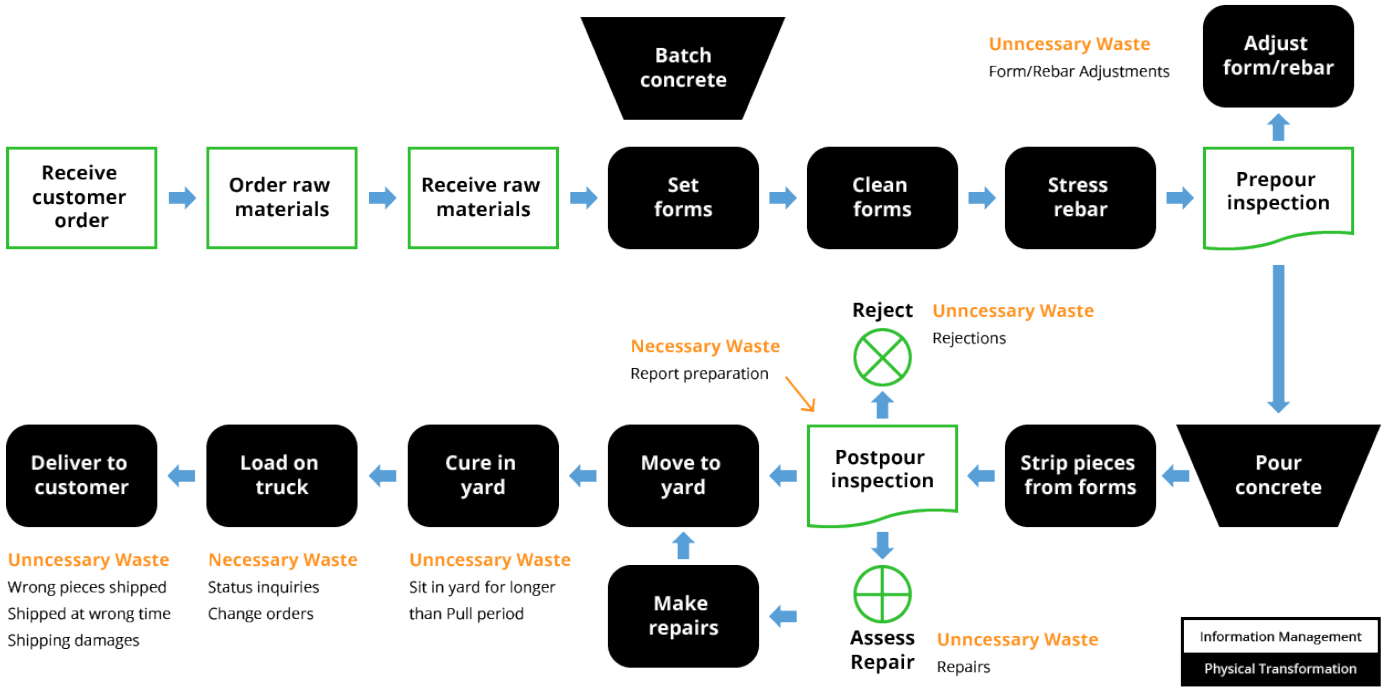


Figure 4

The waste highlighted in Figure 4 illustrates samples that have been identified to us in our work with the precast industry; clearly this is just the beginning. Waste can be addressed in three primary ways:

1. Understand the root cause and modify:

- Why are repairs required?
- What forms are most often producing the products needing repair?
- What can be done to repair the forms to reduce product repairs?
- Who is most often causing repair issues?

2. Apply technology to automate the mundane causes of waste:

- Eliminate time spent on preparing reports
- Eliminate time spent on the phone responding to inquiries
- Reduce time spent searching for inventory in the yard
- Reduce shipping mistakes

3. Minimize inventory!

- Inventory is the single largest source of waste. Customers have told us that they have held pieces in the yard for 2 years or more. Every day that piece sits, cash is tied up that could otherwise be put to productive use.
- The most effective way to reduce inventory is to build *only* in response to customer pull.
- Producing in response to customer pull requires the shortest possible cycle time.

How does the practice of identifying waste in the value stream contribute to the 17 ways precast manufacturers can increase profits and win bids?

1. Wasteful costs are identified and removed.
2. Repetitive actions are eliminated.
3. Costs of necessary waste are reduced by automation.
4. Inventory needs will be minimized going forward.

Constraints

Bottlenecks of Waste

Constraints are factors in the value stream that limit the ability to accomplish a process or increase the time required to complete it. They are therefore a variant of waste that, when removed, can:

- Shorten the production cycle time
- Eliminate waste
- Enable the greatest possible operating efficiency

Since processes in the value stream are interdependent, every process can be constrained by factors unique to it *and* factors related to other processes:

Constraints in Value Stream for Precast Manufacturer

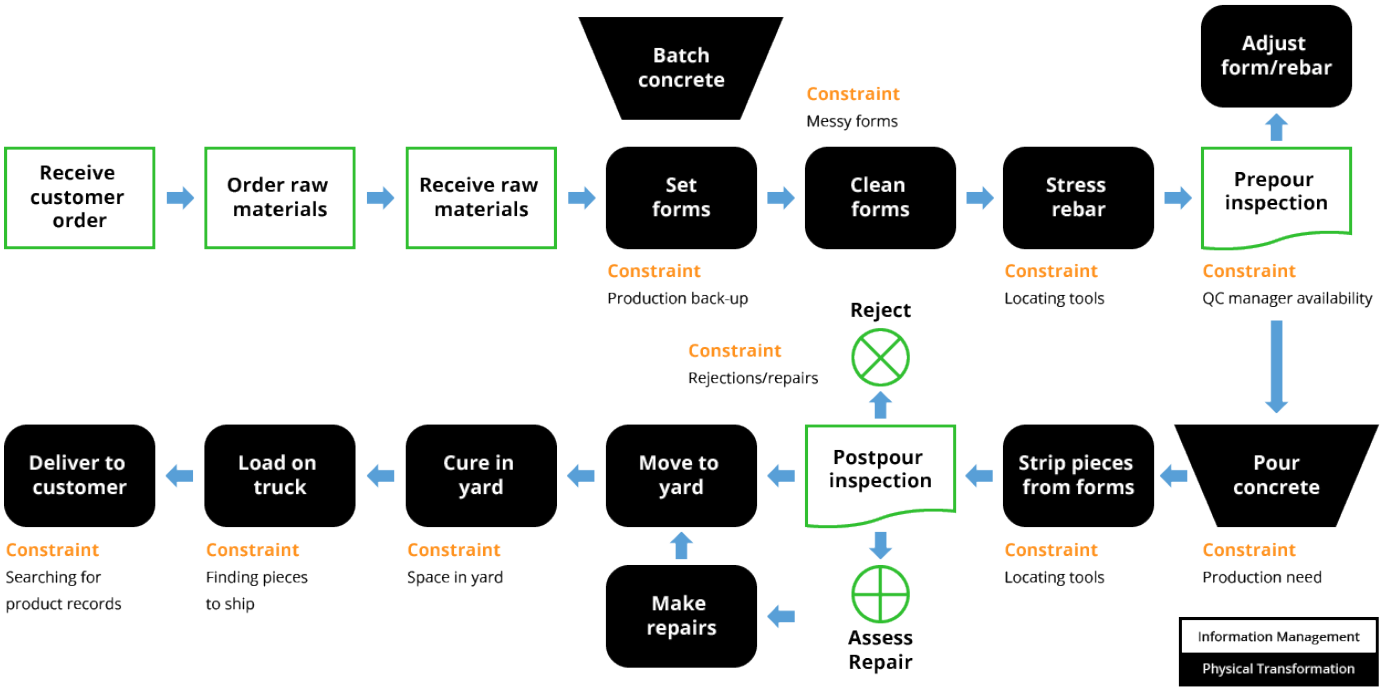


Figure 5

Lean practices involve the continual review of:

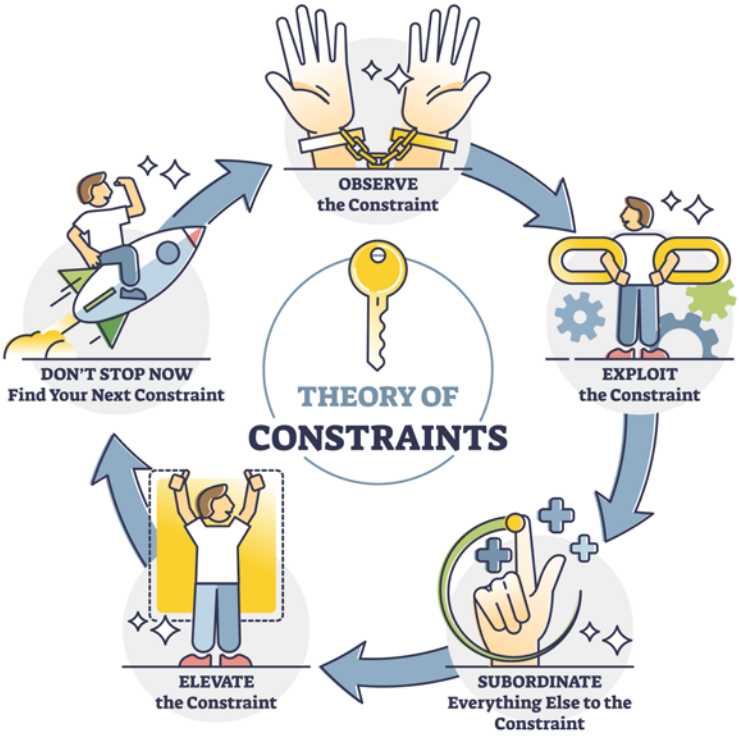
- Process cycle time
- Process constraints
- Solutions for reducing or removing constraints

Theory of Constraints

The Goal, an easy-to-read novel by Eliyahu Goldratt referenced earlier, provides an excellent, in-depth description of Goldratt's Theory of Constraints and provides effective, counter-intuitive methods for addressing them to improve cycle time.

How does the practice of identifying and eliminating constraints in the value stream contribute to the 17 ways precast manufacturers can increase profits and win bids?

1. Shortening the production cycle time will reduce costs.
2. Shortening the production cycle time will increase capacity.
3. Shortening the cycle will enable better customer response.
4. Eliminating constraints will generate cash by reducing inventory.



Conclusion

Discipline and Opportunity

It is obvious by now that a continuous practice of lean methods is scientific in nature; a process of inquiry, hypothesis, trial and review. As such, it requires practitioners to:

- Establish baseline measurements
- Set performance benchmarks
- Measure results
- Repeat

Here, again, is where the application of information technology can be a catalyst for improvement. Using mobile technology to collect data from the plant and web-hosted data storage to access and manage data creates efficiency in the management of lean practices and eliminate the constraints of:

- Inaccuracy from transferring hand-written data
- Time spent collecting data
- Time spent producing reports
- Time spent analyzing data
- Time spent searching for information

At Idencia, we believe that the adoption of lean practices throughout the infrastructure supply chain will be essential to the industry meeting the unprecedented need for (up to) $4.6 trillion of infrastructure investment by 2025 (as estimated by the American Society of Civil Engineers).

17 ways lean manufacturing increases profits and win bids

Identify Customer Value

1. Additional features/services enable higher pricing
2. Customer collaboration will reveal new product opportunities
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4. Become branded as innovative
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Map the Value Stream

7. Make your customer more efficient
8. Identify services that complement the product offering
9. Enable your custowmer experience to be seamless

Reduce Waste

10. Wasteful costs are identified and removed
11. Repetitive actions are eliminated
12. Costs of necessary waste are reduced by automation
13. Inventory needs will be minimized going forward

Eliminate Constraints

14. Shortening the production cycle time will reduce costs
15. Shortening the production cycle time will increase capacity
16. Shortening the cycle will enable better customer response
17. Eliminating constraints will generate cash by reducing inventory

Idencia, Inc. has been around since 2007 perfecting product data tracking for the construction manufacturing industry. We pride ourselves on our presence as a company, our ability to be human and the helpful nature we bring to the industry. Our mission: revolutionize the productivity of the construction supply chain.

Idencia OneSource is our software solution for the precast and prestressed concrete industries, featuring two tools: OneSource Gateway™ for web-based plant management and OneSource Connect™ for mobile data collection. The key to the system are tags on each product with a unique serial number using RFID tags, barcodes, or QR codes to ensure accurate data tracking. If you would like to learn more about everything that Idencia can do, visit our website **www.idencia.com** or reach out to our sales team at **sales@idencia.com**.