

A Better, Faster, Stronger Government Starts with You



Introduction to Continuous Improvement

Improving Minnesota government every day
Learn how you can join the ranks at mn.gov/CI



*Brought to you by the
MN Office of Continuous
Improvement*

Introduction to Continuous Improvement

Course Handout



Table of Contents

Page 1 ... Simulation Exercise Reference Sheet

Page 2 ... What is Continuous Improvement?

- CI Principles and Approaches
- CI Culture
- Plan, Do, Study, Act (PDSA)

Page 4 ... The Eight Wastes

Page 6 ... Process Issues and Solutions

Page 7 ... CI Concepts & Tools

- What is it? and How does it work?

Introduction to Continuous Improvement



Simulation Exercise Information: Department of Permitting (DOP)

Simulation Roles:

- Director (instructor)
- 1 Administrator
- 4 Technicians
- 1 Supervisor
- 1 Materials Coordinator
- 1 Customer
- Observers

Minnesota Statutes XYZ Regulation on Permitting

Every permit shall be on a yellow post-it note with 2 red dots, 2 green dots, 1 yellow dot, and 1 blue dot. The yellow dot shall go in the lower left, the red dots shall go in the middle, the blue dot shall go in the upper right, and the green dots shall go in the two remaining quadrants. The yellow dot must be placed first, followed by the two red dots, followed by the blue dot, followed by the green dots. Failure to produce the permit as outlined above shall be punished pursuant to Minnesota Law.



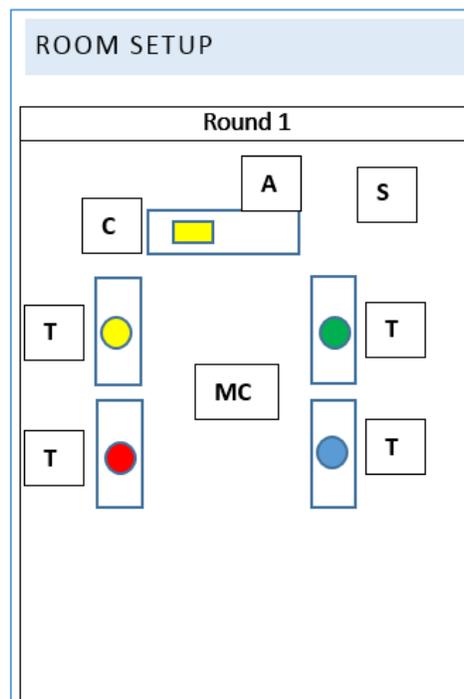
20

Round 1

- 5 minutes
- Create permits in batches of 5
- Complete as many permits as possible
- Only Materials Coordinator moves materials
- Stick to your role (don't change the process)



21



Comments:

- ❖ Consider the “dots” to represent a business step such as a Legal or Financial Review.
- ❖ Expect some unknowns and a bit of ambiguity and the first round may be a bit chaotic ...
- ❖ Expect to see processes or layout that might need to be improved ... just like in real life!

What is Continuous Improvement?



Continuous improvement (CI) is an ongoing effort to improve products, services, and processes.

CI Values/Principles

- **Customer Focus**
Design and improve services based on customer needs and preferences. Provide what customers want, when they want it, and how they want it.
- **Data Driven Decisions**
Base decisions on data and analysis rather than anecdote or intuition. Validate results with data.
- **Focus on Results**
Set specific, measurable, achievable, relevant, and time-bound (SMART) goals, measure and communicate performance, and follow through on commitments.
- **Respect**
Unleash the knowledge, experience, and creativity of employees to improve processes, products, and services. Develop processes for employee success.
- **Performance Excellence**
Challenge the status quo, adapt and apply best practices, innovate, and learn from experience.

CI Approaches

High performing organizations use multiple improvement approaches. Some more common approaches include:

- Lean
- Six Sigma
- WorkOut
- Business Process Management (BPM)
- Total Quality Management (TQM)
- Balanced Scorecard
- Baldrige
- DFSS

Key elements of a CI Culture

- Leaders who model CI principles in their words and actions (Learn-Do-Coach)
- Employee desire to deliver the best products and services to customers
- Openness to learning and change
- Knowledge, expertise, and resources to engage in CI
- Taking action to improve performance – emphasis is on action!
- Measuring, communicating, and recognizing CI efforts



A Cycle of Improvement

CI isn't about instant perfection. It's about ongoing action to improve performance using **Plan-Do-Study-Act**, or **PDSA**.

The PDSA cycle is based on the Scientific Method, in which you have a hypothesis, test it, study the results, adjust your hypothesis, and repeat the cycle as needed.

With a CI project, you plan an improvement, implement changes, study whether the changes achieved desired results, make adjustments as needed, and start the process again.



The “Ideal” Process

Strive to achieve the *Ideal* process. The *Ideal* process maximizes customer value by minimizing inefficiencies or process wastes. The *Ideal* process is completed:

- By one person
- One at a time (no batching)
- As soon as the request is made
- Without interruption (continuous flow from one task to the next)
- With the information provided
- Correctly the first time (without errors or defects)

A CI Toolbox

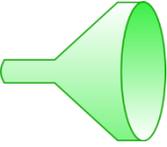
Build your CI toolbox by picking the tools that meet your needs, and adapting them to your situation and challenges.

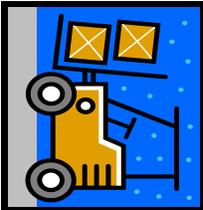
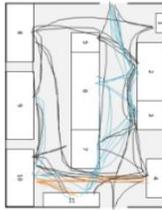
Plan			Do	Study	Act
Define	Measure	Analyze	Improve		Control
What results do we want?	Where should we focus?	What are the root causes of problems?	What solutions should we implement? Did the solutions achieve our desired results?	What adjustments should we make? How will we sustain results?	
Tools <ul style="list-style-type: none"> • Project Charter • Team Norms • SIPOC Diagram • Voice of the Customer Techniques • Stakeholder Map • Benchmarking 	Tools <ul style="list-style-type: none"> • Swim Lane Map • Value Stream Map • Spaghetti Map • Process Analysis • Control Chart • Statistics • Cost/Benefit Analysis • Performance measures 	Tools <ul style="list-style-type: none"> • Brainstorming • Cause and Effect Analysis (Fishbone) • 5 Whys • Affinity Diagram • Relations Diagram • Surveys 	Tools <ul style="list-style-type: none"> • Brainstorming • Idea Box • Ranking and Voting • 2 x 2 Table • Decision Matrix • Cost/Benefit Analysis • Impact Wheel • FMEA • Mistake Proofing • Implementation Plan • Performance Measures • Before/After Analysis • 5S 	Tools <ul style="list-style-type: none"> • Control Plan • Standard Work • Post-Project Review • Storyboard • Visual Measures 	

Identifying and Removing Process Waste



The first step - and sometimes the most difficult - is seeing the waste!

<p>Defects</p> <p>The effort involved in inspecting for and fixing defects, errors, and mistakes.</p> <p>Examples</p> <ul style="list-style-type: none"> Data errors, typos & lost records Delivering information or materials to the wrong location Missing or incomplete information on forms  <p>Typical Causes</p> <ul style="list-style-type: none"> Missing and incorrect information Unclear or complex process Unclear roles and responsibilities Confusing instructions or req. Voice of the customer absent Poor or inappropriate equipment, materials or supplies <p>Solutions</p> <ul style="list-style-type: none"> Apply problem solving tools Verify customer requirements Create standard work Error proof (poka-yoke) Apply "Plain Language" Automate forms - put in hard stops that don't allow partial information Require all information up front Track & share accuracy measures 	<p>Overproduction</p> <p>Producing more products or services than the customer needs or downstream process can use right away.</p> <p>Examples</p> <ul style="list-style-type: none"> More staff working or attending meetings than is needed Doing work not required Sending unnecessary emails Batching and bottlenecks  <p>Typical Causes</p> <ul style="list-style-type: none"> Unclear customer requirements Uneven work flow Poor workflow process Poor worker distribution Different staff skills, productivity, or work difficulty <p>Solutions</p> <ul style="list-style-type: none"> Verify customer requirements and align process with req. Use one step process flow Use "Effective Meetings" tool Apply "Plain Language" Revise process schedule to even out workload Assign more staff or shift roles and responsibilities at peak times 	<p>Waiting</p> <p>Idle time created when material, information, people, or equipment is not ready.</p> <p>Examples</p> <ul style="list-style-type: none"> Approval queues Waiting for decisions or services Waiting for customer information, supplies or copies  <p>Typical Causes</p> <ul style="list-style-type: none"> Missing and incorrect information Unclear or confusing process Unclear roles and responsibilities "System" downtime Signature requirements Not leveraging technology Lack of workers/service providers <p>Solutions</p> <ul style="list-style-type: none"> Require all information up front Combine tasks or functions to eliminate handoffs and waits Use concurrent process Apply 5S Co-locate work to minimize wait due to transportation/motion Eliminate non-value added steps Maintain equipment and machinery 	<p>Non-utilized Staff Talent</p> <p>Not adequately leveraging peoples' skills, creativity and talents.</p> <p>Examples</p> <ul style="list-style-type: none"> Staff hired to do "x", but spending time on "y" Lack of innovation Not involving staff in solving problems and ensuring CI  <p>Typical Causes</p> <ul style="list-style-type: none"> Lack of awareness of CI principles, approaches, and tools Unclear or confusing process Not delegating work Unclear or inappropriate job descriptions or duties <p>Solutions</p> <ul style="list-style-type: none"> Set clear performance expectations Coach and train employees Provide tools and resources Ask staff "What can I do to support your work and remove barriers to improvement?" Engage staff in a CI project See where the work is done, ask questions, & learn (go to Gemba)
---	---	--	--

<h3>Transportation</h3> <p>Moving products, equipment, materials, information, or people from one place to another.</p> <p>Examples</p> <ul style="list-style-type: none"> • Routing documents • Paperwork hand-offs • Carrying or retrieving files • Transporting patients • Site inspections 	<h3>Inventory/Storage</h3> <p>Unnecessary storage of information and materials or more information and materials than is needed.</p> <p>Examples</p> <ul style="list-style-type: none"> • Storing the same document in many places • Backlog (work in process) • Obsolete databases/files/folders • Unread or undeleted emails • Supplies you do not use 	<h3>Motion</h3> <p>Unnecessary movement of workers and tools that takes time, uses energy, and may create health and safety issues.</p> <p>Examples</p> <ul style="list-style-type: none"> • Trips to copier • Looking through cabinets for needed supplies • Walking to find people • Extra computer clicks 	<h3>Extra Processing</h3> <p>Process steps that do not add value to the product or service, including doing work beyond a customer's specifications.</p> <p>Examples</p> <ul style="list-style-type: none"> • Signatures • Preparing an elaborate report when a data table will do • Forms with unused data fields • Bureaucratic language • Re-entering or checking data  <p>Typical Causes</p> <ul style="list-style-type: none"> • Past practices; culture does not question the status quo • Standard work is not aligned with the voice of the customer • Lack of trust/ control issues • Poor communication • Not leveraging technology <p>Solutions</p> <ul style="list-style-type: none"> • Identify customer requirements and align work with req. • Delete or automate signature requirements • Know which process steps add value and eliminate non-value added steps (Quick Hits) • Apply "Plain Language" • Automate where appropriate
<p>Typical Causes</p> <ul style="list-style-type: none"> • Transportation not viewed as a waste • Distance and physical structure • Staff turnover/relocation • New or replaced equipment • Poor planning and communication <p>Solutions</p> <ul style="list-style-type: none"> • Leverage technology (allow staff to telecommute) • Only order what you will use • Collect data to understand transportation problems (spaghetti map) • Analyze data to determine root causes before defining solutions 	<p>Typical Causes</p> <ul style="list-style-type: none"> • Batching work • Not using one-process flow • Technology systems that take time to access • Not leveraging technology • Over-ordering <p>Solutions</p> <ul style="list-style-type: none"> • Use one-step process flow • Revise process steps and schedule to even out workload • Assign more staff or shift roles and responsibilities at peak times • Don't over order • Investigate variations in the time it takes employees to perform the same task (takt time) 	<p>Typical Causes</p> <ul style="list-style-type: none"> • Manual process – not leveraging technology • Non-ergonomic work area • Poor visual management • Linear (consecutive) process • Distance and physical structure • Information silos <p>Solutions</p> <ul style="list-style-type: none"> • Leverage technology • Use concurrent process • Apply 5S • Co-locate work • Clarify process requirements for those upstream and downstream • Move people closer together to enhance communication and collaboration 	<p>Typical Causes</p> <ul style="list-style-type: none"> • Past practices; culture does not question the status quo • Standard work is not aligned with the voice of the customer • Lack of trust/ control issues • Poor communication • Not leveraging technology <p>Solutions</p> <ul style="list-style-type: none"> • Identify customer requirements and align work with req. • Delete or automate signature requirements • Know which process steps add value and eliminate non-value added steps (Quick Hits) • Apply "Plain Language" • Automate where appropriate

Process Issues and Solutions

Process Issues	Solutions
<p>Missing Information</p> <p>May be the result of long lead times, and cause of longer lead times (Catch 22)</p>	<ul style="list-style-type: none"> • Require all information from the customer before the job launches (don't enable bad behavior) • Put in hard stops that don't allow partial information (e.g., online hotel reservations)
<p>Wrong Information</p>	<ul style="list-style-type: none"> • Use menus where a small number of choices exist • Only collect the information you need • Clearly define the information you need • Create a review process with the customer before the job launches • Create and report on measurements for information accuracy
<p>Assumptions</p> <p>Assumptions usually result from incomplete information, or information that does not arrive when it should, so adds defects to the process</p>	<ul style="list-style-type: none"> • Get the right information at the right time • Automate forms or applications and require all fields to be completed before information can be submitted
<p>Poor Information Flow</p> <p>Contributing factors:</p> <ul style="list-style-type: none"> • Batching* • Different employee processing time • Distance and physical structure • Lack of trust (<i>I don't trust you to do this job correctly</i>) • Control issues (<i>This is mine, you can't have it!</i>) • Defects or errors • Past practices 	<ul style="list-style-type: none"> • Eliminate non-value added steps • Eliminate or reduce batching • Combine tasks or functions to reduce handoffs and waits • Ask and challenge responses to "Can fewer people perform more steps in the process?" • Shift roles and responsibilities to address high service flow (e.g., "Bus!") • Give permission and provide training for people to take on more steps in the process • Identify parts of the process that can be done at the same time (concurrent) • Provide clear guidance (i.e., standard work) • Make sure clear, accurate information is gathered at the earliest possible step in the process • If the structure is creating information silos, clarify process requirements for those upstream and downstream. Also move people closer together to enhance communication and collaboration • Co-locate work to reduce motion and transportation • Investigate and address significant variations in the time it takes employees to perform the same task (takt time) • Solve the root cause of problems • Automate process steps where possible and appropriate

* Batching is when we wait for a certain amount of items (i.e., batch) or time before performing the next step in the process. Batching is effective when there is a high "switching cost" in setup time between activities and larger runs reduce unit cost. In most instances, batching increases wait time for customers, because it holds up work that is ready to move to the next process step. Batching is a non-value added activity and often leads to additional non-value added activities to keep track of batches.



	What is it?	How does it work?
5S	<p>A method to organize work areas.</p> <ol style="list-style-type: none"> Sort (remove what is not needed) Set in Order (organize needed items) Shine (clean work area) Standardize (write standards for above steps) Sustain (regularly apply the standards) 	<p>Provides a method for eliminating waste that results from a poorly organized work area (e.g., wasting time looking for information/documents).</p>
8 Wastes	<p>Descriptions of non-value added components in our work processes. Wastes include: Defects, Overproduction, Waiting, Non-utilized staff talent, Transportation, Inventory, Motion, and Extra processing.</p>	<p>Once you understand the 8 wastes, you are better able to see them in your processes and take actions to remove them.</p>
A3	<p>A one-page document used to understand and solve a problem or plan and communicate an improvement project. An A3 incorporates PDSA and refers to the paper size (11"x17").</p>	<p>An A3 is a simple tool for planning, communicating, and ensuring your project follows the PDSA methodology.</p>
Batching	<p>Batching is when we wait for a certain amount of items (i.e., batch) or time before performing the next step in the process. In most instances, batching increases wait time for customers, because it holds up work that is ready to move to the next process step.</p>	<p>Batching is effective when there is a high switching cost or set up time between process steps so you "batch" to reduce unit costs. , such as time needed to access a data system,</p>
Kaizen	<p>Kaizen is a Japanese word that translates to "continuous improvement." It most often refers to an event during which employees rapidly improve a process using CI tools. Kaizen emphasizes the empowerment of all employees to suggest and implement process improvements.</p>	<p>Kaizen events are typically led by a neutral facilitator over the course of one to five days. The facilitator leads a team in:</p> <ol style="list-style-type: none"> Mapping an existing process Identifying the waste in the process Brainstorming improvements Mapping out a new, improved process Developing an action plan to implement the new process
Lean	<p>A method, set of tools, and mindset for improving work areas and processes by eliminating waste. Lean strives to create the <i>Ideal Process</i>. The Ideal process is:</p> <ul style="list-style-type: none"> Completed by one person Completed one at a time (no batching) Completed as soon as the request is made Completed without interruption (continuous flow) Completed with the information provided Completed correctly the first time – no errors or defects 	<ol style="list-style-type: none"> Specifies value from the customer standpoint. Eliminates process steps that do not add value. Achieves tight sequence between process steps so the product or service flows smoothly toward the customer (one-piece flow). Allows customers to pull value from the process versus having the process pushed to them (e.g., customer can order their license online versus having to come to a physical location with limited service hours). Follows PDSA until the <i>Ideal</i> (no-waste) process is created.

	What is it?	How does it work?
PDSA	The Lean methodology (Deming Cycle): <ul style="list-style-type: none"> Plan (establish plan and expected results) Do (implement plan) Study/Check (verify results achieved) Act (review and assess; do it again) 	Applies a scientific approach to making improvements. The iterative process ensures learning is captured and improvements are continuous.
Poka-Yoke	Design error detection and prevention into production processes with the goal of achieving zero defects.	Eliminates errors through design, which saves resources in looking for and fixing errors later in the process.
Process Mapping	A technique to document the sequence and flow of steps in a process.	Helps you see how current work is done, and allows you to identify wastes and value added process steps.
Process Measures	Metrics that tell you how well you are doing and if operations are functioning properly.	Process measures make it possible to set goals, evaluate if strategies are achieving desired results, and communicate results.
Root Cause Analysis	A problem solving approach that resolves the underlying causes of a problem, instead of applying quick fixes to visible symptoms. Some typical root cause analysis tools are 5 Whys, fishbone diagram, and affinity and relations diagrams.	Helps to ensure that a problem is eliminated by applying solutions or corrective measures to the “root cause” of the problem. A common approach is to ask why five times – each time moving a step closer to discovering the true underlying problem.
SIPOC Diagram	A tool used to identify high-level, relevant elements of a process improvement project. SIPOC is an acronym for: Suppliers, Inputs, Process, Outputs, and Customers.	It is a valuable tool for scoping a Kaizen event or problem solving project.
Six Sigma	An approach for reducing process errors and variation using improvement experts, a structured method, performance measures, and tools. Six Sigma refers to a goal of 3.4 defects per million units produced.	Six Sigma is a great approach for complex improvement projects. Six Sigma follows the DMAIC method: D efine, M easure, A nalyze, I mprove, and C ontrol.
Standard Work	Documented procedures that capture <i>current</i> best practices (including the sequence and time to complete each task). Standardized work is living documentation of how the work should be done (it continually evolves through Kaizen).	Standardized work helps maintain service quality, provides a baseline for future improvement activities, and allows easier onboarding of staff.
Visual Management	Visual signals to communicate information needed to make business decisions. This mapping can identify wastes or areas requiring further analysis.	Visual management makes the state and condition of processes easily accessible and clear to everyone. The meters and gauges on a car dashboard are a common example.
Voice of the Customer	The needs, expectations, and service preferences of customers.	Helps in the design and delivery of products/services and assessing performance.
WorkOut	A method for managers and teams to identify and prioritize opportunities for improvement. A WorkOut is typically completed in a half-day session led by a neutral facilitator.	During a WorkOut the team: <ol style="list-style-type: none"> 1. Defines processes for delivering services 2. Identifies process challenges and barriers 3. Brainstorms solutions 4. Sorts and prioritizes solutions