Continuous Process Improvement (CPI)
Toolbox
An organization pursuing CPI should embrace all applicable concepts, tools, techniques, and methodologies that will drive it toward better attainment of enterprise objectives. While no organization is likely to (or needs to) master every improvement technique, the objective is to seek out the best means available to effectively address challenges to continuous improvement. There are key tools, concepts and techniques that have evolved to support an organization in its continuous improvement journey.

There will no doubt be additional tools and techniques created through human ingenuity to respond to difficulties which process owners have not yet faced. An unfortunately common error is to become overly focused on a single methodology or tradition to the exclusion of others. Attempting to apply the same tool or technique to every problem will inevitably result in some sub-optimization or possibly failures. A more holistic approach defines each problem carefully and applies the appropriate improvement tool or technique.

This attachment briefly describes the evolution of continuous improvement as an organizational imperative, and then identifies a sampling of the more common tools, concepts and techniques currently available to drive CPI. There are numerous detailed publications on specific continuous improvement techniques so their discussion is limited in number and scope within this guidebook. Following that, helpful documentation guides and checklists are provided. Additional insight and knowledge can be gained from the resources identified in Attachment A.

The Evolution of Continuous Improvement

**Just-In-Time**

Just-In-Time (JIT) was pioneered at Toyota in the 1950s. JIT is a philosophy of continuous improvement with a set of concepts and techniques geared to better meet the needs of customers through elimination of waste that negatively impacts process flows and the value-added component of any product or service. JIT is thought to originate in Japanese study of American grocery stores replenishment processes where meeting customer changing demands and spoilage challenges have to be carefully balanced. JIT was originally focused on production shop floor improvement and gradually expanded to focus on a variety of staff functions.

**Lean**

Lean is the evolution of JIT over the past decade leading into the 21st century. Several lean refinements include value stream mapping and refined continuous improvement application
to any type of organization generating a product or service. Lean is a mindset that drives individual behavior and ultimately culture change. In Lean organizations,

- waste is highlighted as it is encountered,
- waste is relentlessly attacked using a variety of simple and effective tools,
- the environment challenges employees to expand their capabilities and creativity,
- leaders challenge traditional processing conventions and metrics,
- the ability to respond to the customer is quicker, with higher quality products and services at lower cost, and
- everyone listens intently to the voice of its customers in providing new and improved products and services, striving for continuous quality, cycle time, and cost improvements.

**Continuous Process Improvement (CPI)**

CPI for the purposes of the DoD Enterprise is the evolution of JIT, lean, and other best practices to support cost effective readiness support to the warfighter. CPI contains a toolbox with an open architecture that welcomes any effective combination of continuous improvement tools and techniques. These combinations may or may not be organized to be pulled out to achieve specific objectives. All remain at the immediate access to the CPI practitioner. An example of the components of a typical toolbox might include elements of Lean, Theory of Constraints (TOC), and Six Sigma (6σ). No single set of components in a toolbox is ideal to fully drive CPI under all circumstances.
Tools, Concepts, and Techniques

Cellular Processing

Cellular flow as a technique consists of grouping nodes in a supply chain, people and machines dedicated to production or repair operations, and service activities so that a process can advance from one step to the next without waiting for a batching to be completed. Opportunities for continuous improvement have increased visibility in a cellular flow environment (see Figure E-1). Cells and flow are set up to make it easy to see the workflow, the operational status, and identify problems.

Cellular flow results in improved predictable customer response, product and services’ quality, cycle times.

A cell utilizes minimal time, space, and materials to get the job completed. This is by design to minimize travel distances as well as allow for ease of movement of material from step to step.

DMAIC (Define-Measure-Analyze-Improve-Control)

DMAIC is an ordered problem-solving methodology applied widely in private and public sector organizations. The letters are an acronym for the five phases of Six Sigma improvement. These phases direct a process improvement team logically from problem definition to implementing solutions that are linked to root causes. The methodology also focuses on establishing best practices to help ensure the improvement solutions stay in place. DMAIC is typically implemented through two primary modes in Six Sigma improvement efforts, the project team approach—which normally involves full-time deployment of key team members for 1 to 4 months or the kaizen approach—which stresses rapid, intense progress through all DMAIC stages except full-scale implementation.

Error Proofing (Poka Yoke)

Finding and correcting defects caused by errors costs more and more as a system or component flows through a process. To prevent this expense industrial sites have long been placing a great deal of attention on the concept of error-proofing. Shigeo Shingo introduced the concept of Poka-Yoke at Toyota Motor Corporation. Poka Yoke (pronounced “poh-kah yoh-kay”) translates to “avoid unintentional errors.”
The heart of error proofing is simply to pay careful attention to every activity in the process and to place checks and problem prevention at each step. It is a matter of constant, instantaneous feedback that is implemented by using simple objects like warning devices to make common mistakes virtually impossible. These devices have the following characteristics:

1. User-friendly
2. Simple to install
3. Do not require continuous attention from the employee (ideally, it should work even if the employee is not aware of it)
4. Low-cost
5. Provides instantaneous feedback, prevention, or correction

Error proofing is designed to prevent mistakes, not merely catch them. Mechanisms such as limit switches, optical inspection systems, guide pins, or automatic shutoffs are common error-proofing strategies. These devices can be electrical, mechanical, procedural, visual, human, or any other form that prevents incorrect execution of a process step. They can be implemented in areas other than production such as logistics, procurement, information systems, maintenance and service, or product development, where the cost of mistakes can be as much as in industrial operations.

**Kanban**

Kanban is a signal that is sent from a customer to a supplier within an organization’s internal operations and/or throughout an entire supply chain to link a customer’s demands to the entire supplier chain for quick replenishment. The concept of Kanban has been extended beyond the original card concept to include other forms of triggering signals. The key is that the Kanban signal is a precise trigger that happens at precisely the same time as a demand arises for a product or service, such as a warfighter’s need for replacement of a weapons system or component and serves to trigger the timely required response.

**Automated Resource Planning**

As manufactured products and volumes became more complex, and computer technology advanced, Materials Requirements Planning (MRP) and Manufacturing Resources Planning (MRP II) tools were designed and implemented to replace manual scheduling processes and support expanded operational organizational information sharing. When applied with well-structured disciplines, MRP is capable of accurately tracking inventory, ordering materials, and capacity planning. MRP is best used as a planning device and decision-making tool for the intermediate and long-term planning of material requirements. The effectiveness of this planning tool is a function of the accuracy of the planning parameters used, the predictability of both supply and demand, the careful configuration of the system to the enterprise needs, and the rigid disciplines with which it must be employed. A variant of this methodology in maintenance, repair and overhaul (MRO) activity considers repair, replace, and use-as-is probability factors. MRP II is the
expanded application of MRP logic and related data gathering and sharing capabilities across an organization to support planning, execution, and control activities.

Enterprise Resource Planning (ERP) is the evolutionary tool originating from MRP and MRP II. World class users of enterprise resource planning systems (ERP) take advantage of their planning capabilities to ensure integrated effectiveness of the physical, material, and human resources required within their organizations and with their external supply chains to meet customer requirements. MRP II and ERP are automated technologies that promote cross-functional multi-level intra and extra-organizational information sharing, which important elements in continuous improvement.

**Mixed Model Scheduling**

In the situation where an organization is asked to produce or service more than one model of anything, the usual tendency is to set up dedicated lines for each product. This, in essence, is building in batches and not in the proportion of the customer expectation. Mixed model scheduling is a technique that aims to provide in the exact proportion what the customer orders. This approach requires very quick changeover and high process reliability.

**Pull**

Pull is the concept related to only providing material, products or services to the following customer process when they are required. Customer-supplier relationships are viewed as existing within any organization as well as between an organization and its external customer. Pull relies on predictability in time and quality for effectiveness. Pull is exerted to generate products and services based on the rate of actual consumption, such as replacement of a working weapons system to the warfighter. Pull allows the organization to reduce inventory while simultaneously improving quality cost-effective response to the end customer.

Pull production or maintenance means moving a subassembly or product to the next step only when that step or customer is ready to accept it and needs to actively work with it. Pull is contrasted to a push system where the upstream step determines when the unit is sent to the downstream operation and usually results in excess inventory and an adverse impact on capacity.

**Rapid Improvement Event**

Rapid Improvement Event (RIE) is a relatively short-term, high-intensity effort tool to address a specific problem. The focus may be an effort over several days, a week, or several months and the preparation begins several weeks in front and follow-up continues after. An RIE may also be called by other names, including Rapid Improvement Workshop, Kaizen Event, Kaizen Blitz, and Accelerated Improvement Workshop. The focus is on improving upon the situation as regards the existing problem, not striving for absolute perfection which might take much longer or fail in the complexity of follow-through.
Reliability Centered Maintenance

Reliability is a risk assessment method stated as the probability a system or component will operate, as intended, in a given environment for a specified period of time, within specified maintenance guidelines. Reliability Centered Maintenance (RCM) is a process for determining maintenance requirements of any asset in its operating context. Certain basic questions are asked during the RCM process as depicted in Figure E-2.

![Figure 2. Reliability Fact-Based Decision Making Process](image)

RCM 2 is a revised approach to reliability centered maintenance being implemented by organizations today to continually improve asset reliability. Environmental consequences, revision of terms for clarity, and the addition of a secondary decision process for handling hidden functions were the primary areas of change in the RCM 2 approach.

Scientific Method

A number of problem solving methodologies rely basically on the Scientific Method:

1. Observe and describe the situation.
2. Formulate a problem statement.
3. Use the problem statement to predict results or determine the root cause.
4. Perform controlled tests to confirm initial problem statement expectations.

The Plan-Do-Check-Act (PDCA) and design-measure-analyze-improve-control (DMAIC) methodologies are representative derivatives of these methodologies.
**Six Sigma (6σ)**

Six Sigma (6σ) concepts and tools were originally developed by the University of Tennessee and adapted by Motorola to minimize process variation. Literally speaking, Six Sigma means quality at the plus or minus six standard deviations from the mean level or approximately 3.4 defects per million units of something processed. Six Sigma drives improvement from the top down using a well-defined structure. There are well-defined roles within the Six Sigma approach:

- Executives are trained as “Champions” to help break down barriers
- “Master Black Belts” serve as trainers
- “Black Belts” lead projects and “Green Belts” provide the bulk of the leg work.

Six Sigma does not directly accelerate cycle time and responsiveness, but is essential to reducing variation that adversely impacts on cycle time and cellular flow improvements.

**Takt Time**

Takt Time is a pull concept that was developed to tune the rate of processing to the customer’s rate of need. Synchronizing supply with demand is an important step in eliminating many forms of waste. Takt as a word is usually considered to represent a drumbeat, such as the drumbeat of a process that controls the pace of activity. It is calculated by dividing the amount of available process time by the number of units required to meet customer demand. Takt time can be used to pace the work in any environment.

Takt time is a computed rate that any individual process in a value stream should ideally require in order to exactly satisfy the customer. Takt time analysis is comparing actual process cycle times to the takt time to understand where flow is missing and non-value added steps exist.

**Theory of Constraints**

Theory of Constraints (TOC) is a concept with a set of tools developed by Eliyahu Goldratt that focuses on:

1. Identifying the system’s constraint that limits overall operational performance.
2. Exploiting the system’s constraint to get the most out of it without additional investment, such as running extra shifts, through breaks, etc.
3. Subordinating everything else that is not the system’s constraint to the attention on it, such as giving preferential support to the system’s constraint since it alone determines the cycle time of the total operation.
4. Elevating the system’s constraint to alleviate its influence through purchase of additional equipment, additional personnel capacity, elimination of waste that reduces this process’...
requirements, or redistribution of effort across other process steps to rebalance flow. As a result, some other process element or step now becomes the system’s constraint.

5. Go back to step one and repeat the process for the new system’s constraint.

Critical Chain (CC) is a planning process tool that respects the constraints across a number of different projects or production/service activities such that the practical capacities of key resources are respected and constraints receive elevated visibility in order to be addressed and improve overall organizational throughput and cost performance. CC is often supported by software due to the typical complexity of juggling multiple variables across potentially a number of different project/item flows.

**Value-Added**

Value-added activities change a product or service in a way that customers view as important and necessary. From the opposite perspective, a non-value added (NVA) activity is any step that the customer would not miss if there was a way to eliminate it. If, for example, the delivery of a perfect product without the inspection steps would make the customer just as satisfied.

This strict definition keeps the list of value-added activities very short. That intentionally causes an organization to look hard at every task. As the stack of NVA activities grows, every organization will find that they need to prioritize those they want to attack first. It is not uncommon to find 90 to 99% of the time consumed in a process to be NVA when considering waste in any form. One useful criterion is to separate the pure waste from what is often described as “necessary” NVA. Pure waste can and should be attacked immediately. Necessary NVA activity however may currently be required for a variety of reasons. That is not to say that these NVA activities can be ignored. As technology improves, processes are brought into control, and business conditions change, currently necessary NVA activities can often be minimized or eliminated in the CPI driven enterprise.

**Value Stream Mapping**

Value Stream Mapping is a technique that begins with the objective of identifying the waste in the current state of a production, repair or other service process. The purpose is to use this identification of waste to focus resources on the issues that will make the largest improvements on the process as a whole. The technique draws together process owners, contributors, and users in a cross-functional team setting. Using interview and illustration techniques, a team quickly defines the process steps and the data pertinent to those steps. A subsequent deep review of the sequence and nature of those steps, the transitions between steps, time required and distance spanned, and the information systems employed reveals the level of opportunity for improvement available.

There are typically four steps to driving improvement from value stream mapping:

1. Selecting the Value Stream to be mapped
2. Creating the current state map
3. Creating the future state map

4. Implementation.

A value stream is a set of activities to convert customer needs into delivered products or services. A Value Stream Map (VSM) is a tool that helps visualize and understand the flow of material and information as a product or service makes its way through the value stream. The VSM is displayed at a broad level that visually presents the flow of a product or service from customer to supplier and presents both current state and future state visions. A VSM helps an organization visualize multiple process levels;

make “hidden” decision points apparent;

look at the “big picture” as opposed to a single process step;

quickly see sources of waste in your value stream;

question current material and information flow;

describe how your facility should operate;

see the links between material and information flow;

form the basis of a plan to implement form door-to-door;

identify areas where lean and six sigma tools/techniques are applicable for problem solving;

allocate the appropriate resources to solve the specific problems; and

describe what is going to be done to improve baseline metrics.

A VSM is able to do all of the above, because it is an effective way for people to visualize the following when chosen to be documented during the data analysis:

<table>
<thead>
<tr>
<th>Lead times</th>
<th>Yields</th>
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<tbody>
<tr>
<td>Cycle times</td>
<td>Value added &amp; non-value added steps</td>
</tr>
<tr>
<td>Takt time</td>
<td>Customer forecasts</td>
</tr>
<tr>
<td>Uptime</td>
<td>Raw material orders</td>
</tr>
<tr>
<td>Changeover time</td>
<td>Information flow</td>
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<tr>
<td>Shipping frequencies</td>
<td>Material flow</td>
</tr>
<tr>
<td>Scrap percentages</td>
<td>Changeover times.</td>
</tr>
</tbody>
</table>
A recent addition to the VSM process is consumption value stream mapping by the customer and provisional mapping by suppliers to reduce waste in any form (Womack & Jones, 2005). These alternative maps tend to be less complex and heighten focus on direct customer involvement and voice.

**Waste**

Waste is anything that uses resources without providing value to the customer. Resources may be materials, people, time, tools, etc. The customer may be the internal series of customers or any customer along the extended value stream. Waste exists in all work at all levels within an organization. The ideal goal of CPI is the elimination of all waste within an organization. Typical examples of waste are poor quality, inventory, over production or excess repaired items beyond current demand, unnecessary processing steps, transportation/moving, waiting/delays, and excessive motion beyond the minimum required.

**Documentation and Checklists**

The purpose of this section is to give facilitators a common set of helpful documentation and checklists for use when engaged in CPI tasks/events. These documents might be especially useful to new facilitators of CPI change. It is assumed that these guides will be used by all levels of facilitators to ensure common methodology and consistent efforts.

This documentation begins with the description of a Generic Flow when implementing CPI. It is assumed that the organization leadership received CPI awareness training and is pursuing a CPI approach. The first checklist provided in the guide allows the facilitator to conduct a pre-team meeting with leadership to set the stage for change. The second checklist describes establishing a team charter for the organization’s CPI steering committee. The additional checklists and other documentation describe specific activities that the implementation team should accomplish as well as those that may be used for facilitation purposes. The checklists are provided in a likely sequence of use during CPI implementation. Example: Value Stream Assessment, then SIPOC, then Value Stream Map, then Rapid Improvement Events. An overview of each document is provided below, followed by a corresponding template for each document.

1. **Generic Flow and Facilitation Guide:** This is a description of how CPI activities typically begin and how they should progress.

2. **Pre-Team Meeting Guide:** This describes the information the facilitator should ask the organization’s leadership when starting up an implementation team. Attendees: Champion, Process Owner, Steering Committee key members, facilitator.

3. **CPI Event Analysis and Results Report:** This document is modeled after the A3 report pioneered by Toyota to identify a problem and document the analysis and results.

4. **Steering Committee Charter Accomplishments Checklist:** The next step in this process is to get a Steering Team identified and assist them in writing a charter. The charter checklist shows the minimum information required and care should be taken to make the
charter clear but short and simple. Attendees: Steering Team, Sponsor, Process Owner, Implementation Team leader, facilitator.

5. **Team Kick-Off Meeting Checklist:** This is the first time the implementation team meets. The steering team first reviews and clarifies the team charter, and they all agree upon its details. Then basic CPI team training is accomplished with the steering team in attendance. Attendees: Steering Team, Sponsor, Implementation Team leader and members, facilitator.

6. **Value Stream Assessment Guide:** This is used to identify and prioritize the value streams in the organization. This effort should consider the enterprise level of the organization and ensure Implementation teams are focused on processes that affect the organization’s aligned goals. Attendees: Senior Leadership, Steering Team, Sponsor, Facilitator.

7. **SIPOC Guide:** A Supplier, Input, Process, Output (SIPOC) is a top level checklist approach for addressing the process to be improved. It ensures the implementation team understands where their process starts and ends and who are there customers and suppliers. Attendees: Implementation Team Leader and members, facilitator.

8. **Value Stream Mapping Guide:** This describes the steps to create a Value Stream Map of any process. Attendees: Implementation Team Leader and members, facilitator.

9. **Operational Plan Tracking Sheet:** Used to document CPI projects.

10. **Basic Lean Steps Guide:** This describes the minimum activities that should be accomplished when leaning out a process. Some of the steps are the same as the other guides and can be used to explain the lean process to the implementation team.

11. **Rapid Improvement Event (RIE) Checklist:** This describes the specific steps that should be completed to accomplish an RIE. The RIE process is broken down into three main parts: Pre-Event Activities, the Event itself, and Post-Event Activities.

12. **Six Sigma DMAIC Basic Steps Checklist:** This checklist will outline and explain the basic steps of the Six Sigma tool for the facilitator’s reference and use.

13. **Logical Problem Solving Process:** This document provides a basic approach to solving problems once they have been identified.

14. **VSM Data Collection Checklist:** This lists the minimum data inputs the facilitator should ask the implementation team to collect on the process being improved. Data items that support the organization’s goals and strategic metrics should be added as required to ensure alignment of efforts.

15. **Steering Committee Agenda Checklist:** Identifies the major elements in a steering committee’s typical meeting.

16. **CPI Climate Survey:** This survey should be used before the organization attempts CPI events to determine if they are ready to conduct CPI efforts. If the score is too low in any
area, then more education and training should be accomplished to gain these groups support before beginning CPI. The survey consists of 10 questions to tell a facilitator three things:

a. Is there senior Leader support for CPI?

b. Is there mid-level management support for CPI?

c. Is there floor or basic employee support for CPI?

17. **Meeting Guide and Checklist:** This describes proper meeting dynamics and will help a facilitator make team meetings more effective. It is based on the concept of shared responsibilities in any meeting and control of the time each meeting topic takes. Although it requires the team to identify set times for each topic and stop the discussion if time has expired, the team can add time as it sees fit. The objective is to control the meeting to ensure all topics are covered and team members leave the meeting feeling that they have accomplished something and know what their next tasks are.
GENERIC FLOW & FACILITATION GUIDE

Generic Flow

1. Awareness Training (Transformation and/or LEAN)
2. First Contact from Organization requesting assistance
3. Pre-Team Meeting
4. Steering Committee Charter Accomplishment
5. Team Kick Off Meeting
6. Follow steps of TOOL
7. Implement Changes to Process selected
8. Sustain new Processes and Gains

Facilitator Guides

1. Generic Flow
2. Pre-Team Meeting Guide
3. Steering Committee Charter accomplishment
4. Team Kick Off Meeting Guide
5. Value Stream Assessment Guide
6. SIPOC Guide
7. Value Stream Mapping guide
8. LEAN Basic Steps
9. LEAN Rapid Improvement Event (RIE) Steps
10. Six Sigma Guide
11. Logical Problem Solving Process
12. Data Template
13. Steering Committee Update
14. Implementation Plan Template
15. Climate Survey
16. Meeting Guide
PRE-TEAM MEETING GUIDE

DATE: _____________________

1. Confirm Team Title
   a. Project Description (Background, Problem, Business Case)
   _________________________________________________________________
   _________________________________________________________________
   _________________________________________________________________
   b. Goal: _______________________________________________________
   _________________________________________________________________
   c. Scope: Process Start: ______ Stop: __________
   d. Dates: Start: __________ ECD: __________

2. ID Players
   a. Champion: __________________________________________________
   b. Process Owner: ______________________________________________
   c. Steering Committee: __________________________________________
   d. Tentative Team Lead: _________________________________________
   e. Implementation Team (by Function): _____________________________
   f. Facilitator/Mentor: ___________________________________________

3. Coordinate Stakeholder Survey and Analysis

4. ID Event/Tools to Use: SIPOC, VSM, RIE

5. Plan Steering Committee Charter Accomplishment (60 Minutes)
   a. Date/Time: __________________________________________________

   a. Agenda
   b. Attendees (1st Half. 2nd Half)
   c. Deliverables: Charter, Training

7. Finalize Team Logistics
   a. Meeting Location
   b. Dates/Times
   c. Duration
   d. Frequency
   e. Equipment Needed

8. Other Issues/Questions
# EVENT ANALYSIS AND RESULTS REPORT

### Project Title: ______________________

### Topic: ______________________

<table>
<thead>
<tr>
<th>JDI</th>
<th>RIE</th>
<th>Project</th>
</tr>
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</table>

### Estimated Event Date (From / To):

### Process Owner:

### Team Leaders & Members:

<table>
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<tr>
<th>Problem Description:</th>
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<table>
<thead>
<tr>
<th>Event Description:</th>
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</table>

<table>
<thead>
<tr>
<th>Implementation Costs:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Savings:</th>
</tr>
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</table>
ACCOMPLISHMENTS CHECKLIST

B. Complete Draft 10-Block
   1. ID Event Type
   2. PICK Chart Priority Location
   3. Problem Description
   4. Event Description
   5. Goals/Deliverables
   6. Estimated Event Dates
   7. Process Owner
   8. Implementation Team
   9. Implementation Cost
  10. Savings

C. Team Members and Responsibilities
   1. Steering Committee Members
      a. __________________________
      b. __________________________
      c. __________________________
      d. __________________________
   2. Steering Committee Responsibilities
      Examples:
      • Set Vision/Scope of Effort
      • Establish Goals of Effort
      • Assist team in developing Charter
      • Select Initial Leader
      • Provide Team members
      • Release team members from other duties
      • Fund team effort
      • Ensure team is Facilitated
      • Ensure team has appropriate Training
      • Monitor team Progress
      • Remove Barriers
      • Communicate Team progress to Senior Leadership
      • Reward Team Successes

3. Team Lead Responsibilities
   Examples:
   • Make Assignments
   • Follow the Lean Methodology
   • Learn Lean Tools
   • Help Team Accomplish Goals
   • Regular Communication with Steering Team

4. Team Responsibilities:
   Examples:
   • Attend weekly meetings
   • Be innovative, take risks, and ask Y-Not
   • Update steering committee as required
   • Generate new process recommendations

5. Facilitator Responsibilities
   • Help Leader get organized
   • Be the Process Guide
   • Train and Mentor Team Members

6. Signatures
   a. Process Owner
   b. Steering Committee
      1. __________________________
      2. __________________________
      3. __________________________
      4. __________________________
   c. Team/Project Leader
      __________________________
TEAM KICK OFF MEETING GUIDE

DATE ___________________

***USE of MEETING DYNAMICS REQUIRED***

_____ 1. Introductions/Icebreaker

_____ 2. Identify special team members
   _____ a. Process Owner
   _____ b. Steering Committee
   _____ c. Team Leader
   _____ d. Facilitators, Mentor

_____ 3. Review/Modify Charter

_____ 4. Work Group/Implementation Team Code of Conduct
   _____ a. Start and End on Time (including breaks & lunch)
   _____ b. Use Meeting Dynamics
   _____ c. Maintain Focus
   _____ d. Break Plan (50/10)
   _____ e. Cell Phones/Pagers (VIBRATE ONLY)
   _____ f. Everyone Participates
   _____ g. One Conversation at a Time
   _____ h. No Side Discussions
   _____ i. No Retribution
   _____ j. Decisions By Consensus
   _____ k. Use a “Parking Lot”

_____ 5. Work Group/Implementation Team Logistics
   _____ a. Location
   _____ b. Dates/Times
   _____ c. Frequency
   _____ d. Duration
   _____ e. Equipment
   _____ f. Reporting Process

_____ 6. ID Events

_____ 7. Event Training (SIPOC, VSM, RIE)
VALUE STREAM ASSESSMENT GUIDE

Current State

1. Identify Vision, Scope, Goal (Dir, Div, Branch, Process)

2. Ensure you have Senior Leader Buy-In

3. Identify the right participants (SME, Management, Facilitator)

4. Identify Data Requirements

5. First Team MTG: - Team Introduction
   -- Team Building: Code of Conduct, Logistics
   -- Roles: Leader, Facilitator, Scribe, Recorder, Timer
   -- Team Training: VSM, LEAN Basics

6. Confirm Data and Sources

7. Identify/Group Major Processes in Organization (brainstorm) (Major Groups are the Value Streams)

8. Identify Stakeholders in the 9 Groupings on TT Chart

9. List Stakeholder Group Expectations/Contributions on TT Chart

10. Identify Top 3-5 Expectations for each Stakeholder Group

11. Prioritize Each Stakeholder Group top 3-5 Expectations on separate PICK Charts

12. Identify Common Thread Expectations

13. Prioritize Value Streams on a PICK Chart

14. Build a Prioritized Focus List of Value Streams from PICK Chart

15. Identify VSM Implementation Plan details
SIPOC GUIDE

1. Describe SIPOC Template/Blocks
   a. Suppliers: Provide Inputs to Process
   b. Input: ID All Process Inputs Relative to Project Scope
   c. Process: High-Level Map, 5-6 Steps
   d. Outputs: Process Outputs Delivered to Customer
   e. Customer: Internal, External (End User)

2. ID Customers

3. ID Outputs to Meet Customer Requirements/Expectations

4. ID High-Level Process Steps

5. ID Inputs to Process

6. ID Suppliers
   a. ID Suppliers Who are also Customers

7. Request Process Feedback from Workers (post sheets, e-mails)
   a. Requires Management Approval

8. Walk/Document High-Level Process
   a. Product Spaghetti Chart
   b. Manpower Spaghetti Chart
   c. Collect Step Data (see template)
   d. ID Existing Metric Data (Production Number, Time)
   e. ID/Collect Other Process Data
VALUE STREAM MAPPING GUIDE

1. Validate Data/Sources
2. Review VSM Steps (show visual)
3. Expand Current State (SIPOC Process Steps) (Product and Information Flows)
   a. Touch Time (Active Work Time)
   b. Cycle Time (Receipt to Release)
   c. Number of People in Step
   d. Cost of Step
4. ID Perfect State Map
5. ID Undesirable Effects (UDEs) on T-Chart
6. ID Why UDE is a Problem (T-Chart, Left side)
7. List Possible Solutions to UDEs (T-Chart, Right side)
8. Prioritize UDEs (Pick Chart)
9. ID Future State (optional before or after UDEs)
10. Generate an Implementation Plan (Prioritize UDEs, Categories of:
    a. Just Do It (JDI)
    b. Rapid Improvement Event (RIE)
    c. Project (PROJ)
11. Outbrief Steering Team, Senior Leaders
12. Task Teams with JDIs, RIEs, and Projects
# OPERATIONAL PLAN TRACKING SHEET

## OPERATIONAL PLAN

<table>
<thead>
<tr>
<th>TEAM NAME</th>
<th>PROJECT DESCRIPTION</th>
<th>TEAM LEAD</th>
<th>START DATE</th>
<th>ECD</th>
<th>COMMENTS</th>
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BASIC LEAN STEP GUIDE

DATE

1. Management selects Focus for the Process Improvement event
2. ID Team Members and Baseline Data
3. Conduct a Climate Survey
4. Finalize Team Logistics
5. Conduct 1st Team Meeting
6. Train Implementation Team on Basic LEAN
7. ID “AS IS” and “TO BE”
8. Map Out existing Process
9. ID Value Added and Non-Value Added Steps
10. Map out Optimum Process
11. ID and Prioritize Changes
12. Implement Changes with Detailed Plan(s)
13. Follow up and Recycle
14. Identify Additional Changes
RAPID IMPROVEMENT EVENT STEPS

3 Main Parts

1. Pre Event Activities
   - Management selects Focus, Scope
   - Identify Team Lead and Alternate
   - Identify Steering Team and Implementation Team Members
   - Identify Baseline Data to collect
   - Conduct Organizational Climate Survey
   - Collect Data
     - Customer Demand
     - Customer requirements
     - Historical Production data
   - Communicate team intent/expectations
   - Schedule Team participation
   - Finalize Logistics: Location, dates, times

2. 3-5 Day Event:
   Day 1: Identify Current State
   Day 2: Identify Changes
   Day 3: Prioritize Changes and Detail Actions
   Day 4: Implement Changes and Control Plan
   Day 5: Outbrief Steering Team

3. POST Event Activities
   - Process Owners must manage new Process to Control Plan
   - Identify Problems on Control Boards
   - Identify Solutions to Problems
   - Implement Solutions to New Process
   - Sustain Team commitment and new Process
   - Ensure Solutions Working
   - Sustain Standard Work
   - Stabilize new Process
   - Update Work Documents on all Changes
   - Compare/Analyze Metrics
SIX SIGMA GUIDE (DMAIC)

Steps: D M A I C

The phases of Six Sigma are intended to improve the effectiveness of a process by identifying process variation in satisfying customer requirements and expectations, and then reducing or eliminating the variation. Once the process is stabilized, and achieving the desired level of effectiveness it is then Leaned to optimize the efficiency.

1. Define

The first phase in the DMAIC process is to define the project, develop an improvement project plan, define the process and evaluate progress. The steps include:

   - Establish purpose and scope for the improvement project
   - Develop improvement project plan, including schedule and resources
   - Develop process map, including key elements and boundaries
   - Conduct a Failure Modes and Effects Analysis (FMEA)
   - Identify critical parameters

2. Measure

In the Measure phase existing process data is collected, measurement systems are evaluated and the process capability requirements are identified. The steps in this phase include:

   - Determine process capability requirements or specifications
   - Establish measurement method and tools
   - Determine sampling plan to meet goals
   - Collect data
   - Present status report

3. Analyze

In this phase the process is evaluated to determine its capability. Process data is analyzed to identify opportunities for improvement and to develop plans for improving the process, The steps in this phase include:

   - Convert data into information
   - Determine process capability
   - Develop priority list of parameters
   - Perform root cause analysis

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Update FMEA

Develop improvement plan

Present status report

Determine path forward

4. Improve

In the Improve phase the improvement plan, developed in the Analyze phase, is implemented. The results are evaluated, conclusions are drawn, improvements are finalized and tested. After the desired improvements are implemented the changes to the process are documented and new instructions and procedures are developed. The steps in this phase include:

- Implement improvement plan
- Perform designed experiment if applicable (DOE)
- Measure improvements
- Develop conclusions, recommendations and next steps
- Update documentation
- Present status report

5. Control

The Control Phase is where the improvements become institutionalized. The process changes were documented in the Improve phase. In this phase, control plans are developed to ensure the process continues to be measured and evaluated. This includes implementing process audit plans, data collection plans and plans of action for out-of-control conditions, if they occur. The steps in the Control Phase of the DMAIC process include:

- Establish control system for each critical parameter
- Establish data collection plan
- Establish out-of-control plan
- Establish internal audit plan
- Develop and present final report
**Logical Problem Solving Process**

1. Identify Problems
2. Prioritize Problems based on impact
3. Choose Problem to attack
4. State problem in simple, direct manner
5. Analyze problem (reach root cause)
6. Generate solutions
7. Generate criteria to evaluate solutions against
8. Determine solutions that are not dominated (dominated solutions = there are other solutions that are better in all criteria)
9. From non-dominated solutions, determine feasible solutions (those that are legal, ethical, and meet organization requirements)
10. From feasible solutions, determine optimal solution(s) based on overall effectiveness
11. Perform sensitivity analysis
12. Select and implement final solution
VSM DATA COLLECTION TEMPLATE

OVERALL DATA REQUIRED

1. Customer Demand
2. TAKT TIME
3. Cycle Time
4. Budget Breakdown
5. # of Personnel involved

STEP DATA: (collect for each step of a VSM)

1. Title/Name of Process Step
2. Touch Time: Active Work Time
3. Cycle Time: Time from receipt to release
4. # of People involved
5. Cost of Step Activity
1. Welcome Steering Team, Visitors

2. Identify Steps Accomplished since last Update

3. Identify Next Steps to Accomplish

4. Identify Risks and Barriers

5. Questions from Imp. Team for Steering Team

6. Questions from Steering Team for Imp. Team
Process Improvement Climate
Survey

Questions 2-10 will use the following 1-10 rating scale: 1 = Strongly Disagree. 10 = Strongly Agree. Please CIRCLE the appropriate number for each question.

1. Which of the three categories would you place yourself?
   Senior Leader (Dir, Dep, Div, Div Dep)
   Middle Manager (Sup./Leader)
   Process Owner/Worker

2. I feel my organization’s Senior Leaders Support Process Improvement Efforts.
   Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

3. I feel my Immediate Supervisor Supports Process Improvement Efforts.
   Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

4. I feel I would Support Process Improvement Efforts in my work area.
   Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

5. I feel my Organization Senior Leadership would Resource Process Improvement Efforts.
   Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

   Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

7. I feel I would Resource Process Improvement Efforts in my work area.
   Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

8. I feel that there are plenty of Processes in my organization that could be improved.
   Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

9. I feel I have an Open Mind to new ways of doing business in my work area.
   Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

10. I feel I would initiate or participate in a Process Improvement Effort in my work area if I saw the opportunity.
    Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree
RULES OF ENGAGEMENT for the CPI Climate SURVEY

SURVEY GOAL: To determine three things: Organization’s Support of CPI, Organization’s willingness to Resource CPI Efforts, and Individuals willingness to Initiate/Participate in CPI Efforts.

1. Give to any organization before they start their First Major Process Improvement effort

2. At least 24 Surveys must be completed and averaged to have valid data.

3. Representation from each category should be: 100% of Senior Leaders (Dir, Dep, Div, Div Dep); 50% of Middle Managers (Supervisors/Leads); at least 60% of total Surveys should be from the Process Owner/Worker category. NOTE: This survey should be kept anonymous and Voluntary for Union Employees.

4. Decision Points on Average scores:
   - 8.0 or higher: Support PI. Ready to start an initiative. Management should continue what they are doing. TR will Facilitate Lean efforts in this organization.
   - 4.0 – 7.9: Neutral to PI. Management must strongly articulate support as the Initiative begins. TR will Facilitate LEAN efforts, but must see Leadership involvement.
   - 1.0 – 3.9: Against PI. Opposed to PI. Delay any PI initiatives for 1-2 months until management can change Culture and Attitudes toward PI. Retake Survey before starting Initiative.

5. Expected Averages by Categories and Attitude toward PI:

<table>
<thead>
<tr>
<th>Category</th>
<th>Opposed to PI</th>
<th>Neutral to PI</th>
<th>Support PI</th>
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<tbody>
<tr>
<td>Senior Leaders</td>
<td>6-7</td>
<td>7-9</td>
<td>9-10</td>
</tr>
<tr>
<td>Middle managers</td>
<td>1-3</td>
<td>3-5</td>
<td>6-8</td>
</tr>
<tr>
<td>Process Owners/Workers</td>
<td>2-4</td>
<td>5-7</td>
<td>9-10</td>
</tr>
</tbody>
</table>

6. Suggest Survey be handed out by the DIR/DEP at a Staff MTG with a pitch by Senior Leader. Return in two days.

7. Analysis of the Survey data will be returned two days after turned in to TR for analysis.

8. Refer any questions on the Survey or analysis to your organization’s CPI Core Team.
MEETING GUIDE

ROLES:

LEADER: __________________________ PURPOSE OF MEETING:________________________
TIMEKEEPER: __________________________
FACILITATOR: __________________________
SCRIBE: __________________________
RECORDER: __________________________
PROCESS GUIDE: __________________________

AGENDA:

<table>
<thead>
<tr>
<th>ME</th>
<th>SET ROLES, PURPOSE, AGENDA ITEMS, AND TIMES. 5 MIN</th>
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<tbody>
<tr>
<td>1.</td>
<td>_____________________________________________ __MIN</td>
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<tr>
<td>7.</td>
<td>Wrap Up 5 MIN</td>
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</tbody>
</table>

WRAP UP SPECIFICS:

DATE: __________________________
TASKINGS: WHAT, WHEN, TO WHOM? TIME: _________________
1. ___________________________________________ LOCATION: __________________________
2. ___________________________________________
3. ___________________________________________
4. ___________________________________________
5. ___________________________________________

NEXT MEETING:

DATE: _________________
TIME: __________________________
LOCATION: __________________________

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PROCESSING THE MEETING:

PLUSES

________________________________
________________________________
________________________________
________________________________
________________________________
________________________________
________________________________
________________________________
________________________________

DELTAS

__________________________

MEETING GUIDE WORKSHEET:
MEETING DYNAMICS GUIDE

The Purpose of these Instructions is to briefly describe how to use the Meeting dynamics Worksheet to help you organize a meeting. If you use this worksheet and this format on all your meetings, you should see a reduction in meeting times, a clearer purpose and better organization of your meetings, and more participation and satisfaction from meeting attendees. These changes normally make for better, more effective meetings and communication.

GENERAL INSTRUCTIONS

The Meeting Dynamics Worksheet must be used at the START of every meeting to be effective. As the first Agenda item lists, use the first 3-5 Minutes of each meeting to Identify people for ROLES, state the PURPOSE of the meeting, and set the AGENDA. If you have already sent out a Pre-Agenda to all the meeting attendees or this is a standard meeting, like a Staff Meeting, then show the Pre-Agenda, but still offer an opportunity to add/delete, set/change times for the agenda items. Pick people for each Role who understand the job or quickly tell them what they are to do. People pick up the roles very quickly and you can use the brief description of the roles listed below if you need to explain one. Do your best to Start ON TIME, STAY ON TIME, and END ON TIME, and keep the meeting Focused.

ROLES

LEADER: This is typically the person who requested/called the meeting. However, for Team meetings, it is often effective to rotate leadership. This person directs the group and manages the meeting to accomplish the meeting objectives. The Leader and Facilitator work closely together to make the Meeting effective and efficient. Both are responsible to ensure the meeting covers the planned topics and accomplishes the stated purpose of the Meeting.

TIMEKEEPER: The Timekeeper is the most important role in the meeting. If you do not have a Timekeeper, you are not using Meeting Dynamics. This person tracks the time against the agenda time for each topic. He/she calls out “Two Minutes” and “Time’s Up”, or whatever number of minutes that was identified by the group, to announce the end of each topic. Then the group can decide to add time or stop discussion and go to the next topic. It is very important that you first establish reasonable times per topic, and then STICK TO THE TIMETABLE. The Objective of having a timekeeper is to allow the Team to control the time the team spends on each topic. It is NOT to restrict discussion or hinder communication. Don’t be afraid to call time even when the BOSS is talking. If they agreed to use meeting dynamics, they have agreed to accept the process.

FACILITATOR: The facilitator’s job is to keep the group on track. He/she stops the group from getting off the subject or telling “War Stories” by simply stating “We are getting off track. Lets get back to the subject.” The Facilitator also encourages silent members to speak up and share their thoughts with the team. The facilitator also can act as a Process Guide if the team decides to use a Process tool during the meetings and a separate guide is not available. He/she should know the tool sufficiently to guide the team through the steps and clarify the intent of each step.

SCRIBE: This person mans a Flip Chart or Dry-erase board, or anything used in the meeting to show group progress. In meetings where you Brainstorm ideas or follow a set process like a Problem Solving Process (PSP) or Quality Improvement Process (QIP), this person documents comments so the group sees where they are at all times. The Scribe is a very powerful position since they often paraphrase what the group says. Be careful to ensure the scribe does not take over the Leader’s Role or solve conflicts by writing down just THEIR inputs on the flip chart.
RECORDER: This person functions as the Secretary. They capture notes on the meeting for the minutes and tasking to be reviewed during the Wrap Up. They would also publish Minutes if requested. They must ensure an Attendance sheet is passed around the room to capture names, office symbols, and E-mails of attendees. The recorder should not try to capture every statement made in the meeting, only the agreements or results of the discussions. Keep Minutes Short, and always start the minutes by duplication the Meeting Guide and the agenda that was used.

PROCESS GUIDE: This person leads the team through the steps and special rules when using a tool, as needed. If you do not have an expert on a specific tool, then the Facilitator assumes the responsibility of the Process Guide and must learn enough to implement the tool in the meeting.

PURPOSE

Stating the purpose of the meeting after designating Roles is critical to keep the group FOCUSED. Typical Categories of purposes are: Information Sharing, Decision Making, or Conduct a team Process. If you cannot state the Purpose of the meeting, you probably are not ready to call the meeting. The purpose is especially important for attendees covering the meeting, for others.

AGENDA

Although you may present a draft agenda at the beginning of the meeting, it is NOT FINAL until everyone in the meeting agrees upon it. The first and last topics in the Agenda are always the same. The first is to take time and set up the meeting itself by agreeing on the Roles, Purpose, and Agenda topics and times. The last is always a Wrap-Up of the meeting, described below. The topics themselves can be briefings, in which case the times should be identified by the briefer, to get their buy into the process. Agenda discussion topics, identify the desired outcome, not just to discuss “XXX”. Briefing times should include enough time for questions, not just for the briefing itself. If the group wants to add a topic after the meeting begins, it must be determined if you will add more time, or take time away from another topic. Remember, that there IS FLEXIBILITY to add time or topics, but do it in a controlled environment, decided by the group members themselves.

WRAP UP

The Leader performs the Wrap Up by helping the group decide When and Where the next meeting will be, and Summarizing Taskings and suspended items. Taskings can be a request for an attendee to brief something at the next meeting, a requirement to draft a response back to a customer, or any action that the group feels needs to occur. Ensure a suspense is identified for each tasking. This can be as simple as “By the next meeting.” Or “By a specific date/time.” The Final step in the Wrap Up should be to PROCESS the Meeting. Processing is the act of gaining feedback on how the meeting went and asking for ways to make the next one better. This is accomplished by listing Pluses and Deltas as shown on the worksheet. The pluses are what attendees Liked about the meeting, and Deltas are things that could be Done Better or constructive criticism on member inputs/conduct. Ask yourself, “How could we make the meetings Better?”
KEYS TO SUCCESSFUL MEETING DYNAMICS

1. ASK yourself: “DO we REALLY need a Meeting?” Use Phones, e-mails, VTCs, or telecoms first. Face to face meetings should be our last resort to communicate, especially if travel is required.

2. Pre-Meeting with Leader: Draft Agenda, ID attendees, decide on tools before Meeting
   Rule of Thumb: Use Guide if > 6 people AND > 1 Topic
   (however, the guide can be used at any meeting)

3. Follow Guide: Set Roles, Purpose, Agenda. TK –Critical

4. Explain Meeting. Flexibility and Consensus Voting – THUMBS Rules!
   Thumbs Up: I agree completely.”
   Thumbs Level: I don’t completely agree, but I can Live with it.”
   Thumbs Down: I disagree and cannot accept.”
   Identify Time Calls at 2 min and Time’s up (<30 min topics); halfway, 5, 2, and Time’s Up (> 30 min)

5. Keep Your Sense of HUMOR. Have FUN!

6. STOP when you said you would. NO Exceptions.

7. Add Agenda Topics or Time only on Consensus.

8. Wrap Up completely:
   TASKS: What, Who, When due?
   Next MEETING: When (Date/Time), Where?
   Process MEETING Itself. (Participation, Times, Topics, Focus)