RECAP ALL 5 PHASES & 15 STEPS

RECAP

SIX SIGMA YELLOW BELT CERTIFICATION

THE DEFINE PHASE

DEFINE

SIX SIGMA YELLOW BELT CERTIFICATION

DEFINE PHASE

DEFINE	What problem are you trying to solve?	Tools Used
1. Understand customer and business requirements	• What does the problem look like from your customer's perspective?	Voice of Customer
2. Complete Project Charter		
3. Complete high-level as is process map		

CAPTURE THE VOICE OF CUSTOMER

- SURVEYS
- INTERVIEWS
- FOCUS GROUPS
- SUGGESTIONS
- COMPLAINTS
- COMPLIMENTS
- OBSERVATIONS
- OTHER TECHNOLOGY DRIVEN SOCIAL MEDIA PLATFORMS

TRANSLATE VOICES TO REQUIREMENTS

Voice of Customer (Verbatim)	Critical Customer Criteria (Need)	Critical to Quality (CTQ) (Requirement / Performance)
Take the exact voice of customer	Write excerpt from customers verbatim showcasing the customer's need	Write the customer's need in measurable terms

DEFINE PHASE

DEFINE	What problem are you trying to solve?	Tools Used
1. Understand customer and business requirements	• What does the problem look like from your customer's perspective?	Voice of Customer
2. Complete Project Charter	• How do you know there is a problem? • What specific measures indicate there is a problem?	Project Charter
3. Complete high-level as is process map		

PROJECT CHARTER TEMPLATE:

PROBLEM STATEMENT:

- What “pain” are we or our customers experiencing?

GOAL STATEMENT:

- Define the improvement objective in terms of the Primary Metric in the Problem Statement
- Start with a verb: Reduce, Eliminate, Control, Increase, Improve…

PROJECT SCOPE:

- What are the boundaries of the initiative?

PROJECT TEAM:

- Enter data on Project Leader, Champion, Yellow Belt, Subject Matter Experts and any other resources participating

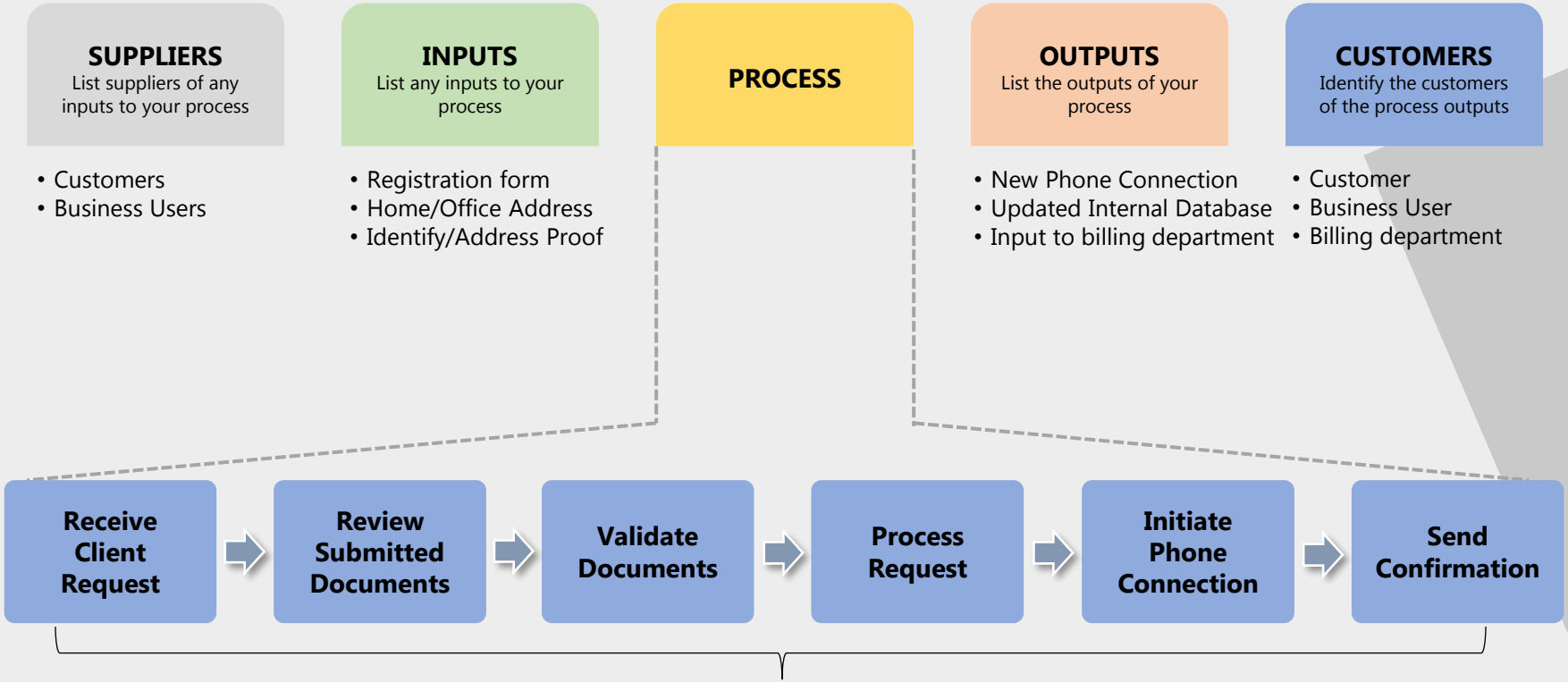
MILESTONES:

- Enter a table depicting completion date of each DMAIC phase

DEFINE PHASE

DEFINE	What problem are you trying to solve?	Tools Used
1. Understand customer and business requirements	• What does the problem look like from your customer's perspective?	Voice of Customer
2. Complete Project Charter	• How do you know there is a problem? • What specific measures indicate there is a problem?	Project Charter
3. Complete high-level as is process map	• Where is the problem occurring?	SIPOC

SIPOC EXAMPLE – GET A NEW WIRELESS CONNECTION



THE MEASURE PHASE

MEASURE

SIX SIGMA YELLOW BELT CERTIFICATION

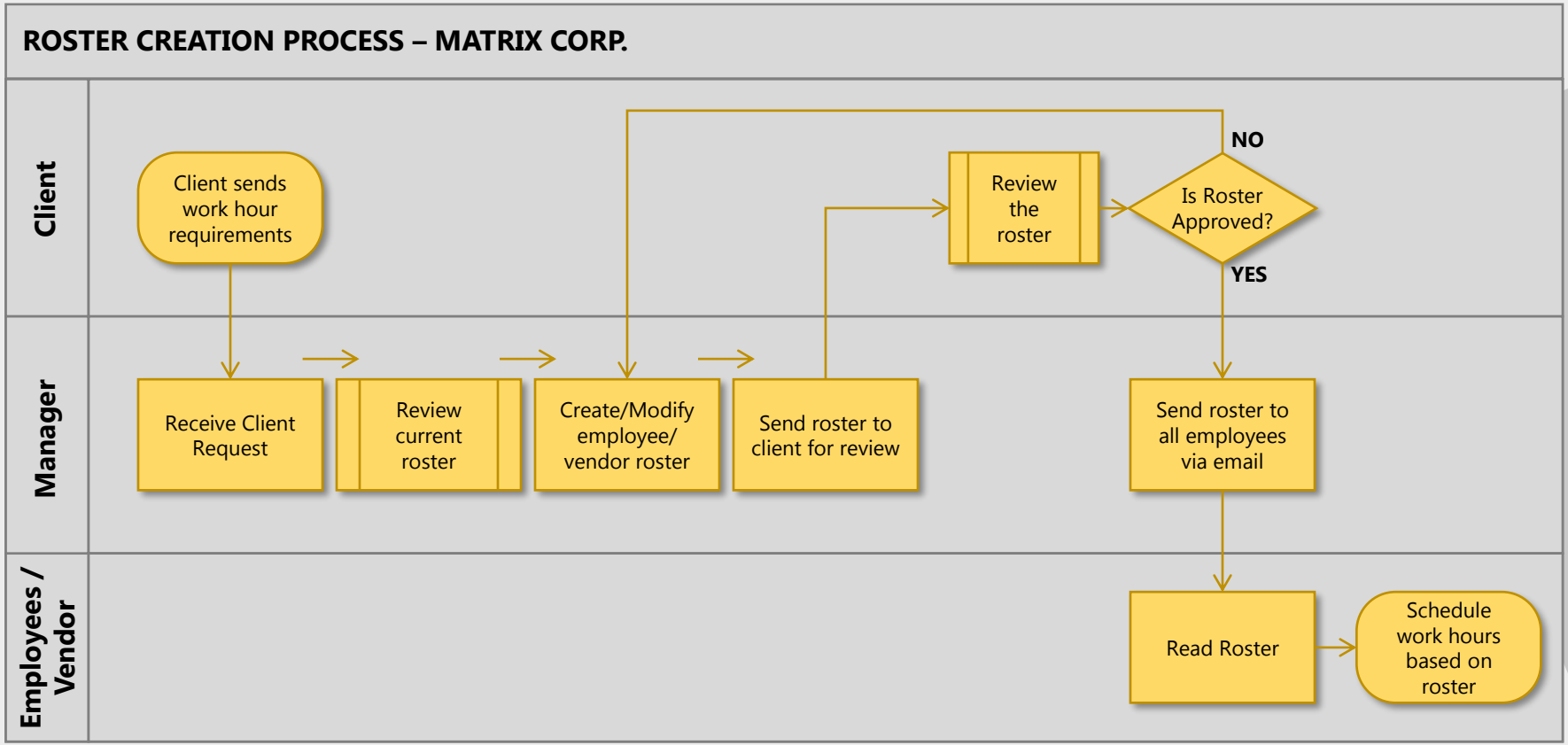
MEASURE PHASE

MEASURE	What is the extent of the problem?	Tools Used
4. Identify What to Measure	• What does the detailed process currently look like?	Process Maps 8 Wastes
5. Plan & Collect Data		
6. Determine Baseline Performance		

MEASURE PHASE

SYMBOL	DESCRIPTION & USAGE
	• Connects any two steps and shows the path or direction of the process
	• Indicates where the process starts and stops
	• Describes the actual work task that occurs at that point in the process; • It generally is best to include only one task in each activity symbol
	• Identifies when the process comes to a temporary halt • Also identifies what has to happen before the process resumes
	• Shows that a database is associated with this step
	• Indicates that a written document is prepared or used at that step of the process; the name of the document appears in the symbol
	• Indicates a pre-defined process
	• Indicates when something goes into storage for some period of time; it contains a brief description of what is stored and for how long
	• Displays a question that has several optional answers/flows that lead away from the diamond; • Answers can be simple “Yes” or “No” or specifically described choices • Answers are labeled on connector lines

PROCESS MAP EXAMPLE (TYPE: SWIMLANE)



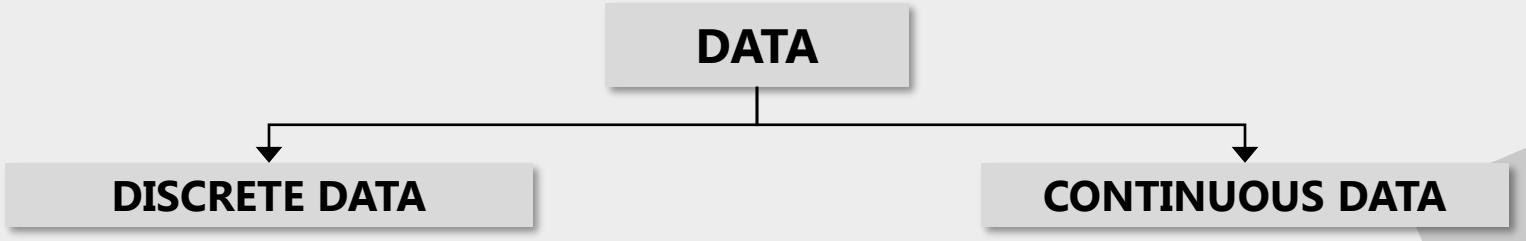
EIGHT TYPES OF WASTE = DOWNTIME

	What it is?	What to Look For?
1 **D**efects	• Defective transactions, errors leading to rework	• Rejects, not in good order transactions sent for research or repair • Missing information, rework loops or breaks
2 **O**ver Production	• Producing too much, or producing too soon	• Effort not aligned with risk, complexity or customer needs • More information requested than required
3 **W**aiting	• Waiting for documents, resources or information	• Idle time, waiting for information • Overfull inboxes
4 **N**on-Utilized Skills	• Failure to utilize the time and talents of people	• Significant portion of expert time "wasted" on low value activities
5 **T**ransportation	• Work transferring across platforms or teams, non essential transportation	• Excessive back and forth, repeated follow-ups • Movement from location to location, building to building
6 **I**nventory	• Work stuck in In-boxes not being processed, idle financial or fixed assets	• Bottlenecks leading to "staging" areas for work in progress • Idle or underutilized equipment
7 **M**otion	• Inefficient placement of resources creating motion	• Inefficient placement of office resources • Physical distance between workstations
8 **E**xcess Processing	• Excessive processing of transactions	• Similar information being captured in several places • Large variations in time to do similar tasks

MEASURE PHASE

MEASURE	What is the extent of the problem?	Tools Used
4. Identify What to Measure	• What does the detailed process currently look like?	Process Maps 8 Wastes
5. Plan & Collect Data	• How can we ensure data collection is robust? What does the data say?	Continuous Data Discrete Data Data Collection Plan Sampling
6. Determine Baseline Performance		

TYPES OF DATA



- aka Attribute Data
- Discrete data is information that can be categorized into a classification
- Discrete data is based on counts
- Finite number of values is possible and values cannot be subdivided meaningfully
- E.g. No. of Parts damaged in shipment, no. of road accidents, etc.

- aka Variable Data
- Continuous data is information that can be measured on a continuum or scale
- Continuous data can have almost any numeric value and can be meaningfully subdivided into finer and finer increments
- E.g. Length, Size, Temperature, etc.

DATA COLLECTION CHECK SHEET (TEMPLATE)

Project Name: _____

Name of Data Recorder: _____

Location: _____

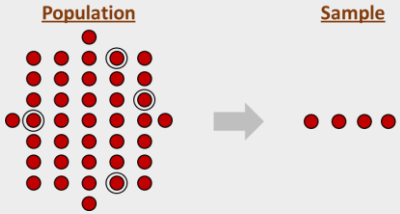
Data Collection Dates: _____

Defect Types / Event Occurrence	Dates							Total
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
Event 1								0
Event 2								0
Event 3								0
Event 4								0
Event 5								0
Event 6								0
Event 7								0
Event 8								0
Event 9								0
Event 10								0
Total	0	0	0	0	0	0	0	

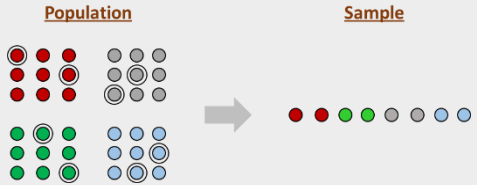
Use the method that best fits your project and timeframes

SAMPLING AND SAMPLING METHODS

SIMPLE RANDOM SAMPLING



STRATIFIED RANDOM SAMPLING

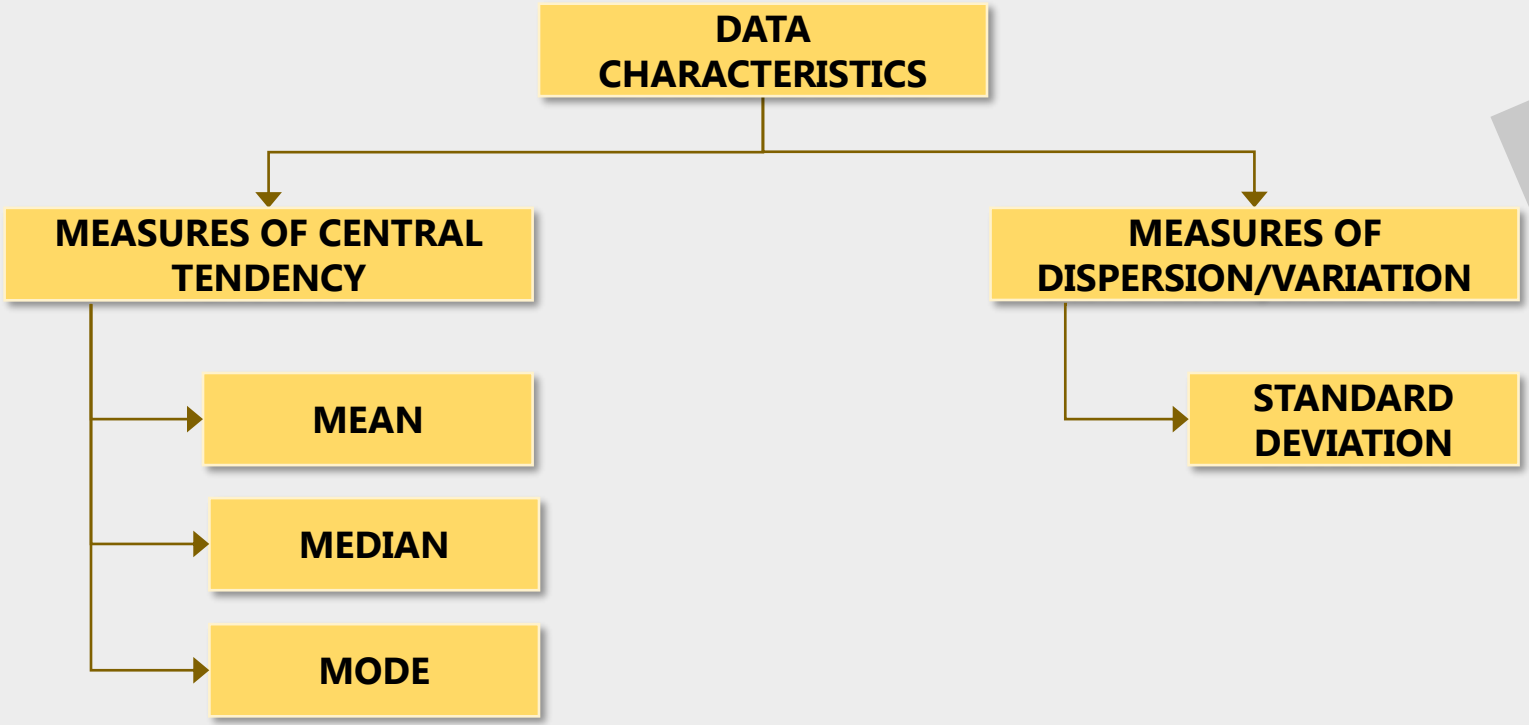


SYSTEMATIC SAMPLING

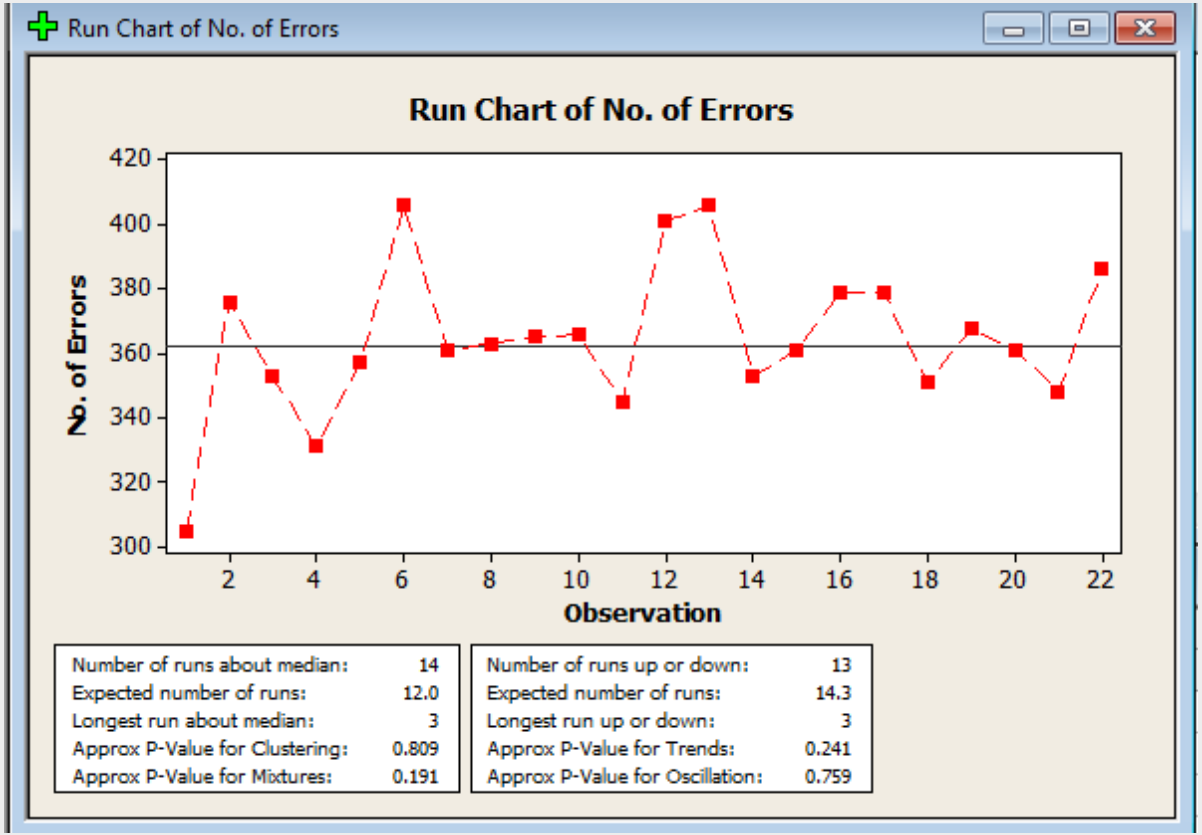
MEASURE PHASE

MEASURE	What is the extent of the problem?	Tools Used
4. Identify What to Measure	• What does the detailed process currently look like?	Process Maps 8 Wastes
5. Plan & Collect Data	• How can we ensure data collection is robust? What does the data say?	Continuous Data Discrete Data Data Collection Plan Sampling
6. Determine Baseline Performance	• Is the process stable? • Is the process capable of meeting the customer requirements?	Mean Median Mode Standard Deviation Run Chart Defects Defectives Opportunity for Error Unit Process Capability

IDENTIFYING DATA CHARACTERISTICS



CHECK THE DATA STABILITY USING RUN CHART



DUDO & PROCESS CAPABILITY ANALYSIS

- DEFECTS
- DEFECTIVES
- UNITS
- OPPORTUNITIES FOR ERRORS
- DEFECTS PER OPPORTUNITY (DPO)
- DEFECTS PER MILLION OPPORTUNITY (DPMO)
- SIGMA CONVERSION TABLE
- PROCESS CAPABILITY ANALYSIS

THE ANALYZE PHASE

ANALYZE

SIX SIGMA YELLOW BELT CERTIFICATION

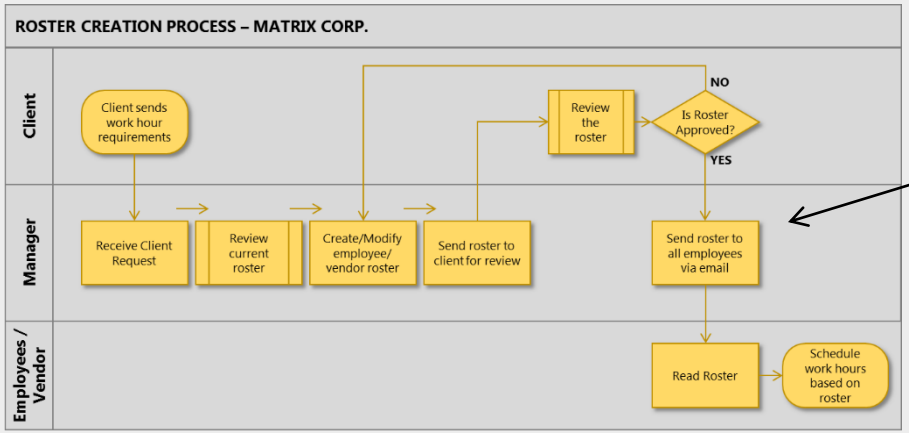
ANALYZE PHASE

ANALYZE	Why is the problem occurring?	Tools Used
7. Identify Performance Gaps	• What are the sources of variation and waste? • What are the potential causes of the problem?	Review Process Maps Fishbone Diagram Brainstorming 5 Why Analysis
8. Ascertain Critical Root-Causes		
9. Validate Root-Causes		

REVIEW OF PROCESS MAPS

PROCESS MAPS WERE CREATED IN STEP 04 OF THE MEASURE PHASE

REVIEW THE PROCESS MAP & IDENTIFY ANY POTENTIAL GAPS



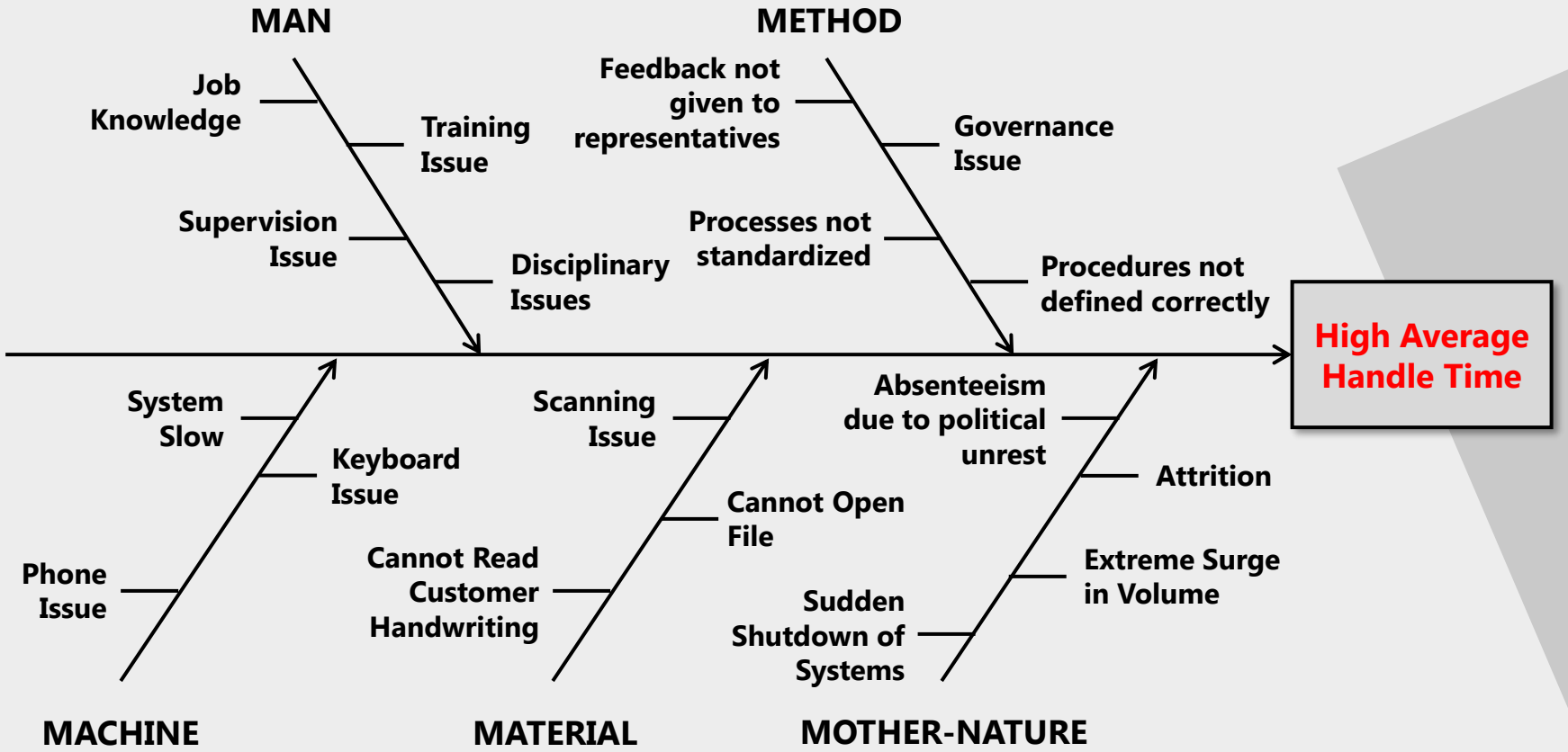
KAIZEN BURST

CAN THERE BE IMPROVED COMMUNICATION OF ROSTERS TO ALL EMPLOYEES / VENDORS SUCH AS MESSAGES OR APPS?

7 TIPS TO CONDUCT EFFECTIVE BRAINSTORMING SESSIONS

1. ESTABLISH THE NEED FOR A BRAINSTORMING
2. DON'T ALLOW PARTICIPANTS TO DEVIATE FROM THE TOPIC
3. ENSURE DOMINATING PARTICIPANTS ARE EFFECTIVELY MANAGED
4. ENSURE EVERYONE PARTICIPATES IN THE DISCUSSION
5. DON'T ENGAGE IN EVALUATING VIABILITY OF THE IDEA
6. ANY CRAZY IDEA IS WELCOME
7. GENUINELY APPRECIATE AND THANK EVERYONE FOR THEIR CONTRIBUTIONS AT THE END OF THE SESSION

FISHBONE DIAGRAM EXAMPLE



5 WHY EXAMPLE

One of the monuments in Washington D.C. is deteriorating!

1	**Why is the monument deteriorating?**	**Because harsh chemicals are frequently used to clean the monument**
2	**Why are harsh chemicals needed?**	**To clean off the large number of bird droppings on the monument**
3	**Why are there a large number of bird droppings on the monument?**	**Because the large population of spiders in and around the monument are a food source to the local birds**
4	**Why is there a large population of spiders in and around the monument?**	**Because vast swarms of insects, on which the spiders feed, are drawn to the monument at dusk**
5	**Why are swarms of insects drawn to the monument at dusk?**	**Because the lighting of the monument in the evening attracts the local insects**

Solution: **Change how the monument is illuminated in the evening; prevent attraction of insects**

ANALYZE PHASE

ANALYZE	Why is the problem occurring?	Tools Used
7. Identify Performance Gaps	• What are the sources of variation and waste? • What are the potential causes of the problem?	Review Process Maps Fishbone Diagram Brainstorming 5 Why Analysis
8. Ascertain Critical Root-Causes	• What are the critical root causes?	Control Impact Matrix
9. Validate Root-Causes		

CONTROL IMPACT MATRIX EXAMPLE

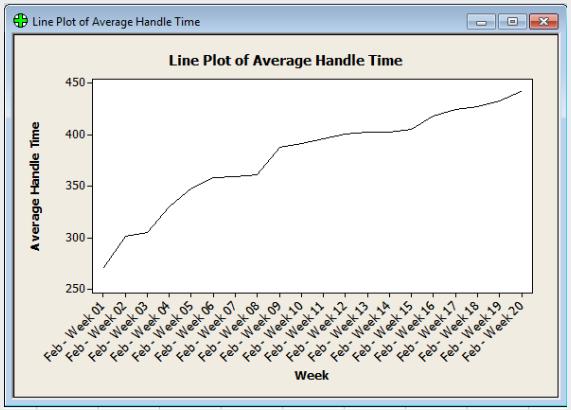
Control \ Impact	High	Medium	Low
In Control	• Job Knowledge • Disciplinary Issue • Feedback not given to representatives • Governance Issue • Processes not standardized • Procedures not defined correctly • Attrition (Employee Turnover)	• Supervision Issue • Training Issue	• Keyboard issue • System Issue • Phone issue
Out of Control	• Absenteeism due to political unrest • Sudden shutdown of systems	• Cannot Open File • Scanning Issue • Cannot read customer handwriting	• Extreme surge in volume

ANALYZE PHASE

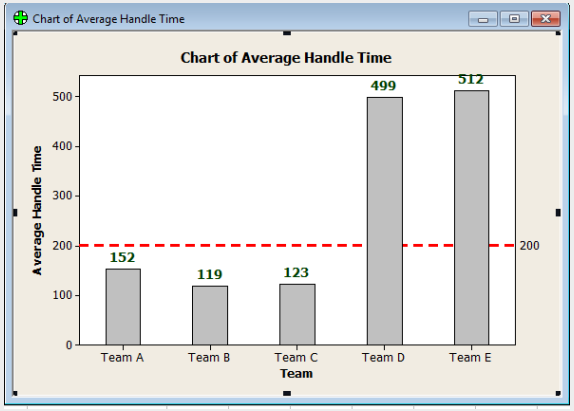
ANALYZE	Why is the problem occurring?	Tools Used
7. Identify Performance Gaps	• What are the sources of variation and waste? • What are the potential causes of the problem?	Review Process Maps Fishbone Diagram Brainstorming 5 Why Analysis
8. Ascertain Critical Root-Causes	• What are the critical root causes?	Control Impact Matrix
9. Validate Root-Causes	• How do you know these are the vital few root causes?	Line Chart Pareto Chart Bar Chart Histogram Pie Chart Scatter Diagram Correlation Analysis

BASIC CHARTS

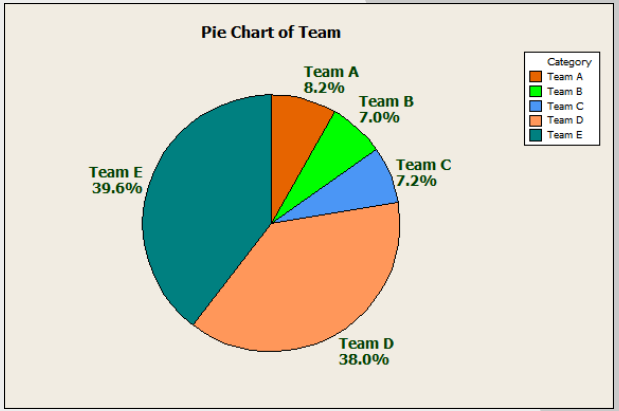
LINE CHART



BAR CHART

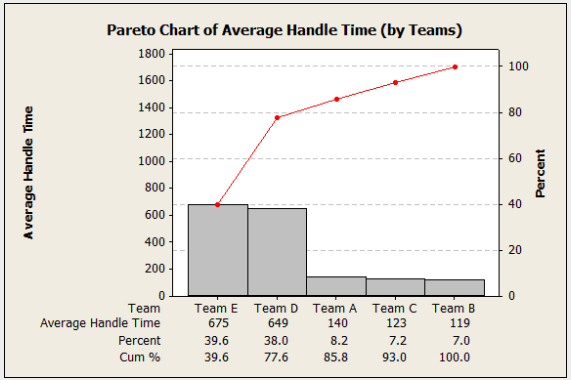


PIE CHART

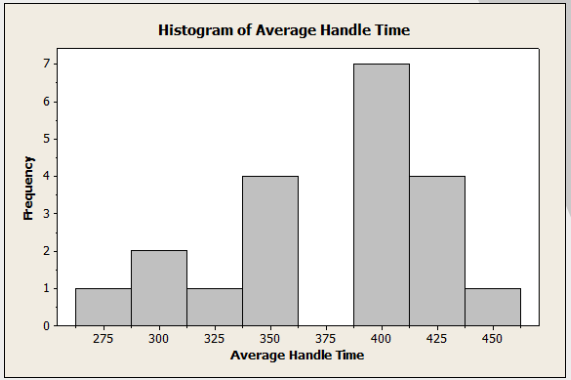


GRAPHICAL TECHNIQUES

PARETO CHART

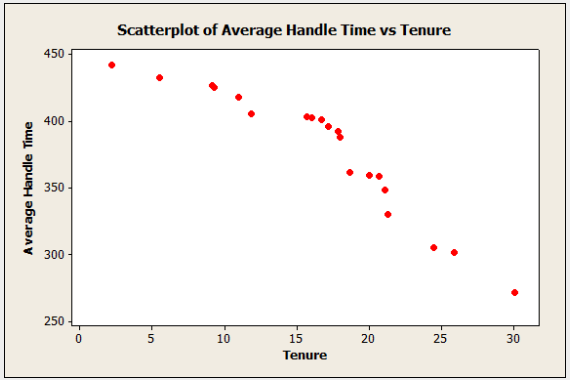


HISTOGRAM

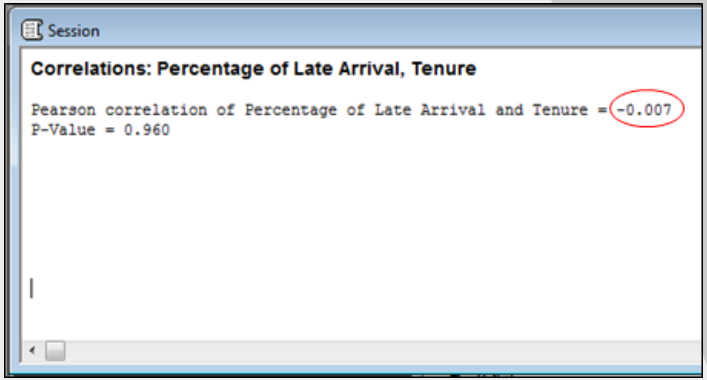


ADDITIONAL ANALYSIS TECHNIQUES

SCATTERPLOT



CORRELATION ANALYSIS



THE IMPROVE PHASE

IMPROVE

SIX SIGMA YELLOW BELT CERTIFICATION

IMPROVE PHASE

IMPROVE	What is the extent of the problem?	Tools Used
10. Generate, Prioritize & Select Potential Solutions	• What will fix the root causes?	Brainstorming Brain Writing 6-3-5 Assumption Busting
11. Pilot Solution(s)		
12. Validate Impact of Solution(s)		

SOLUTION GENERATION TECHNIQUES

RECALL: BRAINSTORMING

BRAINWRITING 6-3-5

ASSUMPTION BUSTING

IMPROVE PHASE

IMPROVE	What is the extent of the problem?	Tools Used
10. Generate, Prioritize & Select Potential Solutions	• What will fix the root causes?	Brainstorming Brain Writing 6-3-5 Assumption Busting
11. Pilot Solution(s)	• How do you know your solutions will be successful?	Pilot Plan Risk Analysis
12. Validate Impact of Solution(s)		

STEPS TO IMPLEMENT A “PILOT”

1. CREATE A PILOT PLAN
2. ENSURE STRONG LEADERSHIP SUPPORT
3. COMMUNICATE THE PLAN TO KEY STAKEHOLDERS
4. TRAIN THE PILOT GROUP
5. IMPLEMENT THE PILOT
6. COLLECT AND ANALYZE FEEDBACK
7. DIAGNOSE GAPS AND REVISE SOLUTIONS
8. IMPLEMENT THE SOLUTIONS

RISK ANALYSIS TEMPLATE

RISK	RISK RATING	MITIGATION	CONTINGENCY	ASSIGNED TO?
Risk Identification	High / Medium / Low	What are you going to do to avoid / minimize risk?	What are you going to do if the risk does surface?	Who's Responsible?

IMPROVE PHASE

IMPROVE	What is the extent of the problem?	Tools Used
10. Generate, Prioritize & Select Potential Solutions	• What will fix the root causes?	Brainstorming Brain Writing 6-3-5 Assumption Busting
11. Pilot Solution(s)	• How do you know your solutions will be successful?	Pilot Plan Risk Analysis
12. Validate Impact of Solution(s)	• How do you know these are the root causes?	Process Capability Re-Analysis

RECALL: PROCESS CAPABILITY (DPMO METHOD)

STEP 01 – COMPUTE DPO

DPO = D / (O*U)

D = TOTAL NUMBER OF DEFECTS

O = OPPORTUNITY FOR DEFECTS PER UNIT

U = TOTAL NUMBER OF UNITS

STEP 02 – COMPUTE DPMO

DPMO = 1,000,000 * DPO

D = 1,000,000 * D/(O*U)

STEP 03 – LOOK UP DPMO IN SIGMA CONVERSION TABLE

THE CONTROL PHASE

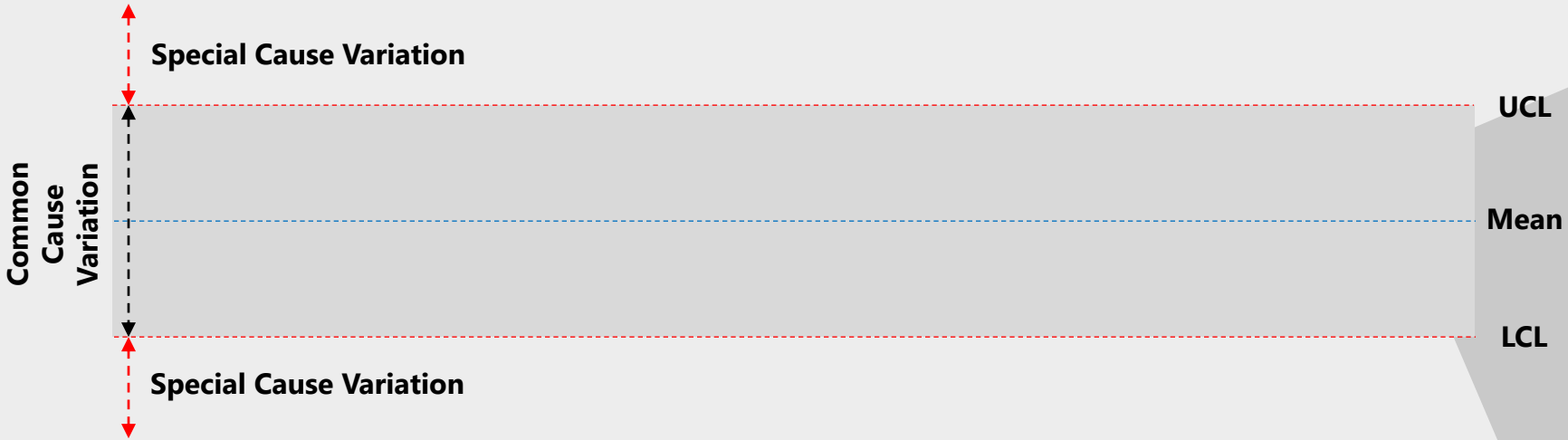
CONTROL

SIX SIGMA YELLOW BELT CERTIFICATION

CONTROL PHASE

IMPROVE	How will you ensure that the problem stays fixed?	Tools Used
13. Institutionalize the Solution(s)	▪ How do you know the problem has been fixed? ▪ How will you track on-going benefits?	Common vs. Special Causes Control Charts Control Plan
14. Replicate & Share Best Practices		
15. Celebrate & Recognize Success		

COMMON CAUSES VS. SPECIAL CAUSES



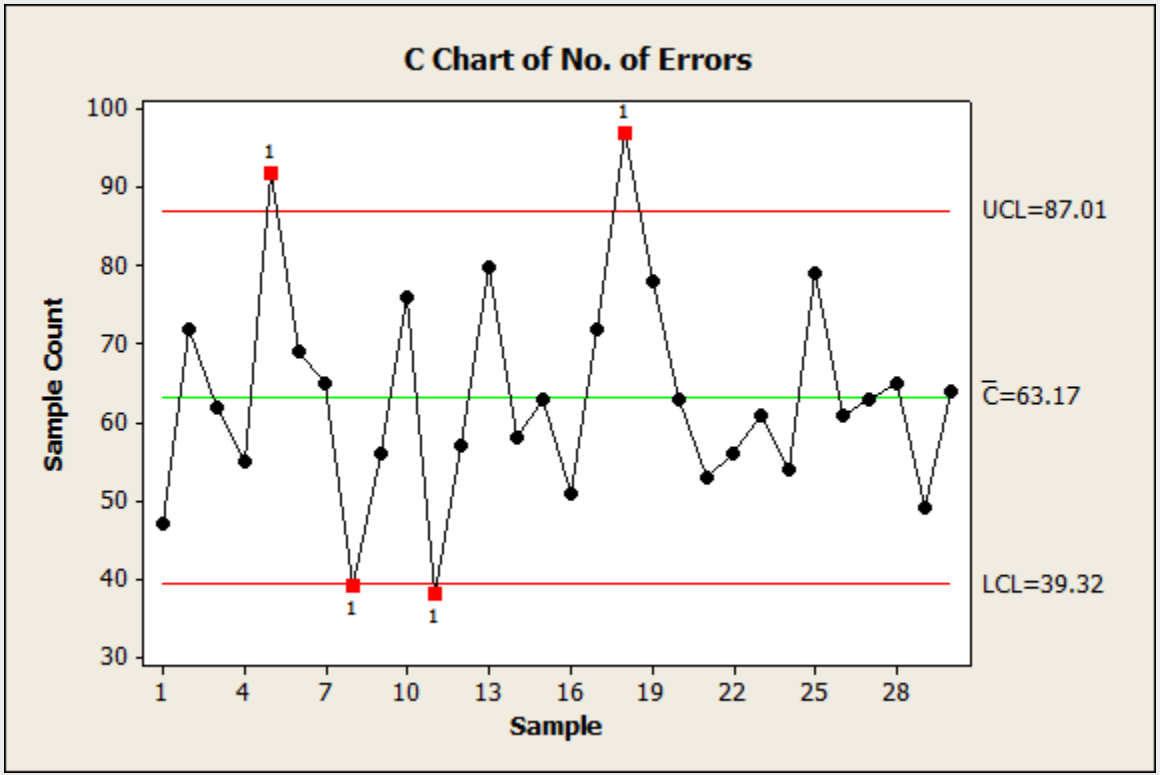
COMMON CAUSES

- PRESENT ALL THE TIME
- HAVE A SMALL EFFECT INDIVIDUALLY
- RESULTS IN A RANDOM VARIATION
- EFFORTS CAN BE TOLERATED

SPECIAL CAUSES

- NOT ALWAYS PRESENT
- TYPICALLY HAS A BIGGER INFLUENCE
- COMES FROM OUTSIDE INFLUENCES
- EFFECT WE WANT TO KNOW ABOUT

YOU WILL LEARN TO CREATE A “C” CHART



CONTROL PLAN TEMPLATE

Process		Method					Action	
			Sample					
Process Step	What is being Controlled?	How is it Measured?	Size	Frequency	Responsible Party	Where is it Recorded?	Response Plan	Responsible Party

CONTROL PHASE

IMPROVE	How will you ensure that the problem stays fixed?	Tools Used
13. Institutionalize the Solution(s)	▪ How do you know the problem has been fixed? ▪ How will you track on-going benefits?	Common vs. Special Causes Control Charts Control Plan
14. Replicate & Share Best Practices	▪ How will you capture knowledge related to best practices and what makes them effective?	Communication
15. Celebrate & Recognize Success		

CREATE A CASE STUDY TEMPLATE

THE CASE STUDY TEMPLATE ENABLES YOU TO CREATE A SHORT CASE STUDY OF A COMPLETED PROJECT. IT INCLUDES:

- **PROJECT GOALS AND PROCESSES ADDRESSED**
- **TOOLS AND APPROACHES EMPLOYED**
- **CHALLENGES FACED AND OVERCOME**
- **BENEFITS REALIZED (FINANCIAL AND OTHERWISE)**
- **INDIVIDUAL TEAM MEMBER'S CONTRIBUTION**

CONTROL PHASE

IMPROVE	How will you ensure that the problem stays fixed?	Tools Used
13. Institutionalize the Solution(s)	▪ How do you know the problem has been fixed? ▪ How will you track on-going benefits?	Common vs. Special Causes Control Charts Control Plan
14. Replicate & Share Best Practices	▪ How will you capture knowledge related to best practices and what makes them effective?	Communication
15. Celebrate & Recognize Success	▪ How will you share your results?	Celebrate

CELEBRATE & RECOGNIZE SUCCESS

BE SURE TO RECOGNIZE THE PERFORMANCE IMPROVEMENTS AND CONGRATULATE TEAM ON SUCCESSES

AND CELEBRATE THE SUCCESS

SIX SIGMA DMAIC ROADMAP

DEFINE → **MEASURE** → **ANALYZE** → **IMPROVE** → **CONTROL**

What Problem are You Trying to Solve?	What is the extent of the problem?	Why is the problem occurring?	What do you propose to do & why?	How will you ensure that the problem stays fixed?
1. Understand Customer & Business Requirements	4. Identify What to Measure	7. Identify Performance Gaps	10. Generate, Prioritize & Select Solutions	13. Institutionalize the Solution(s)
2. Complete the Project Charter	5. Plan & Collect Data	8. Ascertain Critical Root-Causes	11. Pilot Solution(s)	14. Replicate & Share Best Practices
3. Complete the High-Level As Is Process Map	6. Determine Baseline Performance	9. Validate Root Causes	12. Validate Impact of Solution(s)	15. Celebrate & Recognize Success
TOLL GATE - DEFINE	**TOLL GATE - MEASURE**	**TOLL GATE - ANALYZE**	**TOLL GATE - IMPROVE**	**TOLL GATE - CONTROL**

SIX SIGMA DMAIC – TOOLKIT

DEFINE	MEASURE	ANALYZE	IMPROVE	CONTROL
1. Understand Customer & Business Requirements Voice of Customer (VOC)	4. Identify What to Measure Process Maps 8 Wastes	7. Identify Performance Gaps Review of Process Maps Brainstorming Fishbone Diagram 5 Why Analysis	10. Generate, Prioritize & Select Solutions Brainstorming Brainwriting 6-3-5 Assumption Busting	13. Institutionalize the Solution(s) Common vs. Special Causes Control Charts Control Plan
2. Complete the Project Charter Project Charter	5. Plan & Collect Data Continuous Data Discrete Data Mean Median Mode Standard Deviation Data Collection Plan Sampling	8. Ascertain Critical Root-Causes Control Impact Matrix	11. Pilot Solution(s) Pilot Plan Risk Analysis	14. Replicate & Share Best Practices Communication
3. Complete the High-Level As Is Process Map SIPOC	6. Determine Baseline Performance Run Chart Defects Defectives Opportunity for Error Unit Process Capability Analysis	9. Validate Root Causes Line Chart Bar Chart Pie Chart Pareto Chart Histogram Scatter Diagram Correlation Analysis	12. Validate Impact of Solution(s) Process Capability Reanalysis	15. Celebrate & Recognize Success Celebrate

WHAT NEXT?

YOUR SIX SIGMA YELLOW BELT PROJECT JOURNEY