Lean Six Sigma Green Belt Certification Course

simplilearn

Control Plan

Learning Objectives

By the end of this lesson, you will be able to:

- Explain control plan
- List different control plan tools
- Demonstrate transactional control plan

Do You Know

Team 1
Developing a Control Plan

Team 2
Celebrating Project Success

DIGITAL OPERATIONS

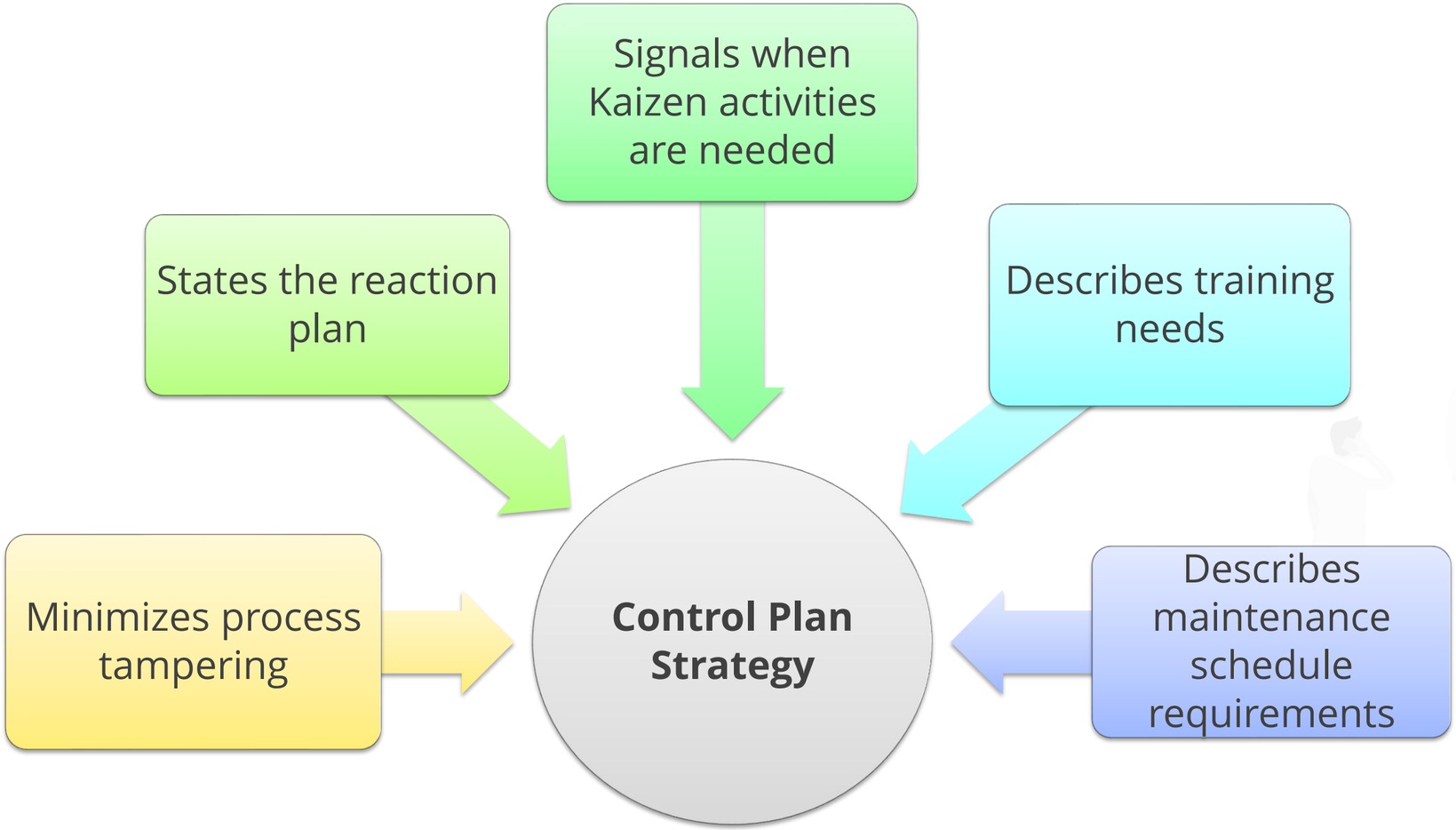
Control Plan to Monitor and Maintain Improvements

Control Plan

Control plan is a written summary description of the system for controlling a process.

- Describes actions required to maintain the desired state of the process
- Describes actions required to minimize process and product variation
- Evolves and changes with the process
- Is considered a knowledge-transfer document;
- Can be created for a process or a step or equipment in a process
- Provides a single point of reference
- Enables assignment of responsibility

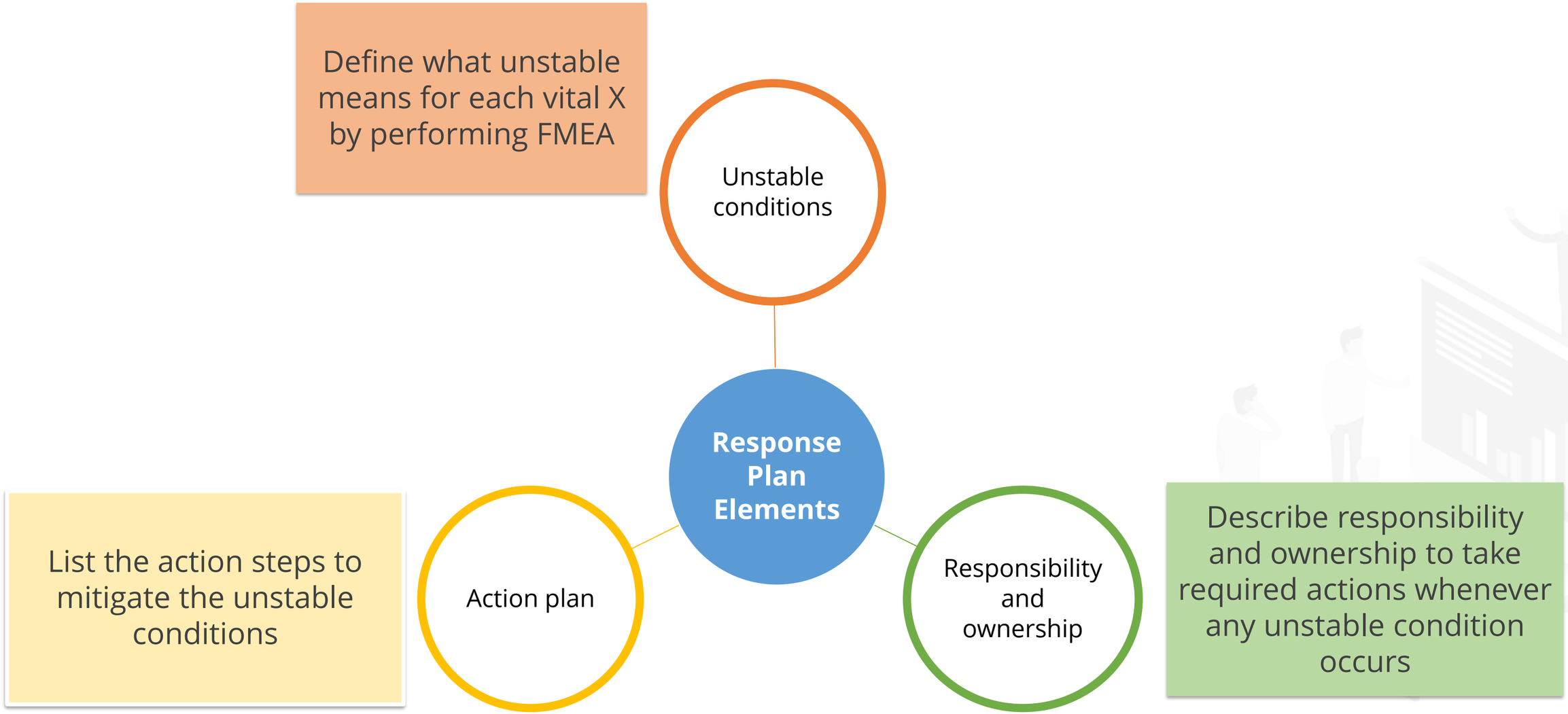
Control Plan



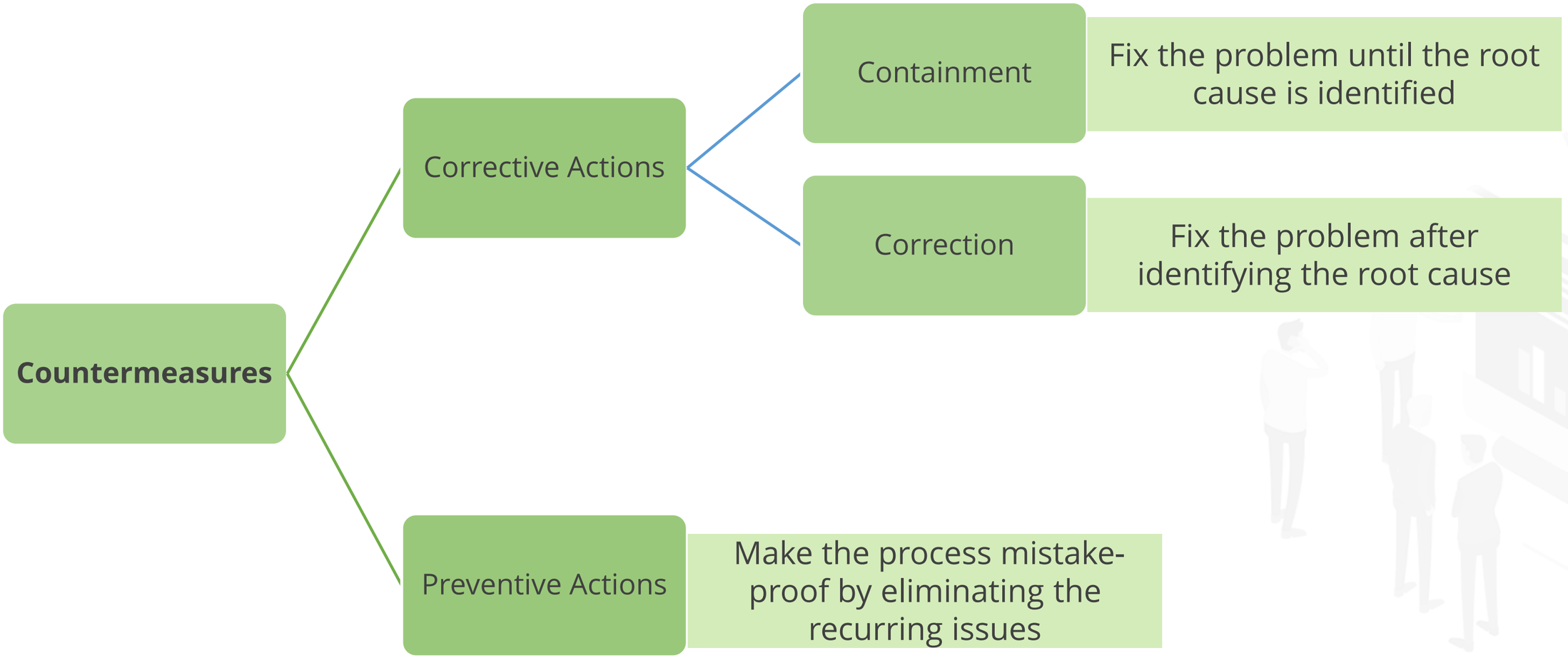
Elements of Control Plan

- Project purpose and objectives
- Risk management plan
- Resource requirements documents
- Process ownership identification
- Communication plan recommendation
- Process stewardship
- Financial analysis and results
- Response Plan

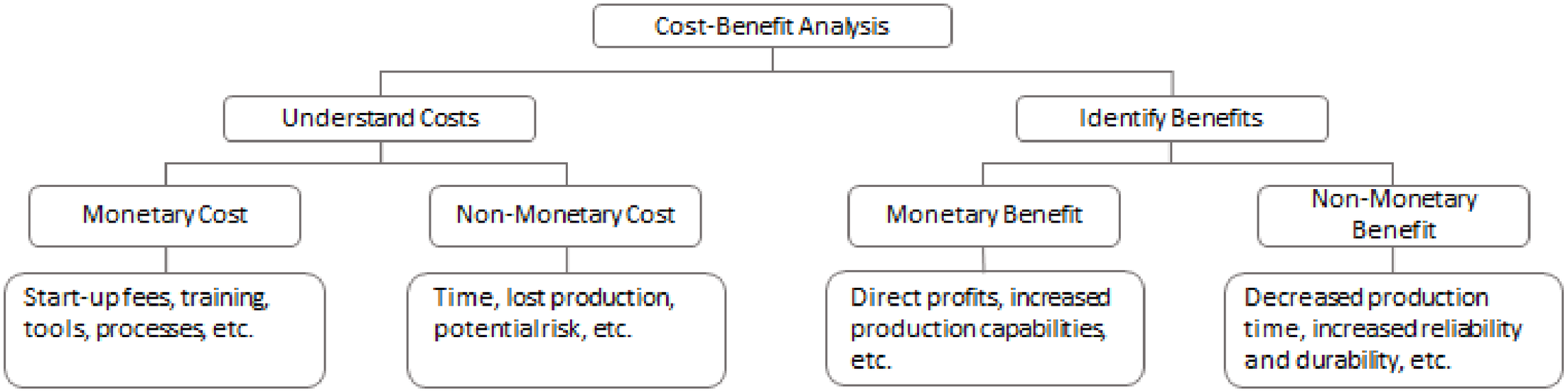
Response Plan



Response Plan: Countermeasures



Cost-Benefit Analysis



Cost-Benefit = All identified costs are subtracted from the expected benefits

What to Control: KPIV and KPOV

It is important to define what needs to be controlled to define a strong control

Process = f (x1, x2, x3...) = Y

Key Performance Input Variable (KPIV)

- The x factors are called KPIV.
- A control plan controls the KPIV.
- A control plan controls the inputs.

Key Performance Output Variable (KPOV)

- The output Y is called KPOV.
- A control plan ensures the desired state for the KPOV.
- A control plan monitors the output.

KPIV

The KPIVs, or the inputs, of the process can be identified using various sources, such as:

- Failure Mode and Effects Analysis (FMEA)
- Cause-and-Effect Matrix or Diagram and Cause Verification Matrix
- Multi-Vari Studies
- Regression Analysis
- Design of Experiments (DOE)

Control Plan Tools

Control Charts	MSA	Error-proofing	SOP	PM
• Useful to track process statistics over time and detect the presence of special causes	• A technique that identifies measurement error (variation) and sources of that error to reduce the variation	• Also known as Poka-Yoke • Refers to implementation of fail-safe mechanisms within a process to prevent it from creating defects	• Also known as Standard Operating Procedures • Is a set of written instructions that details all the steps and activities of a process or procedure	• Also known as Preventive Maintenance • Refers to inclusion of Preventive Maintenance as part of the documented scheduled process or equipment maintenance

Developing a Control Plan

After understanding the process, a multi-functional team must be formed that will be responsible for controlling the process.

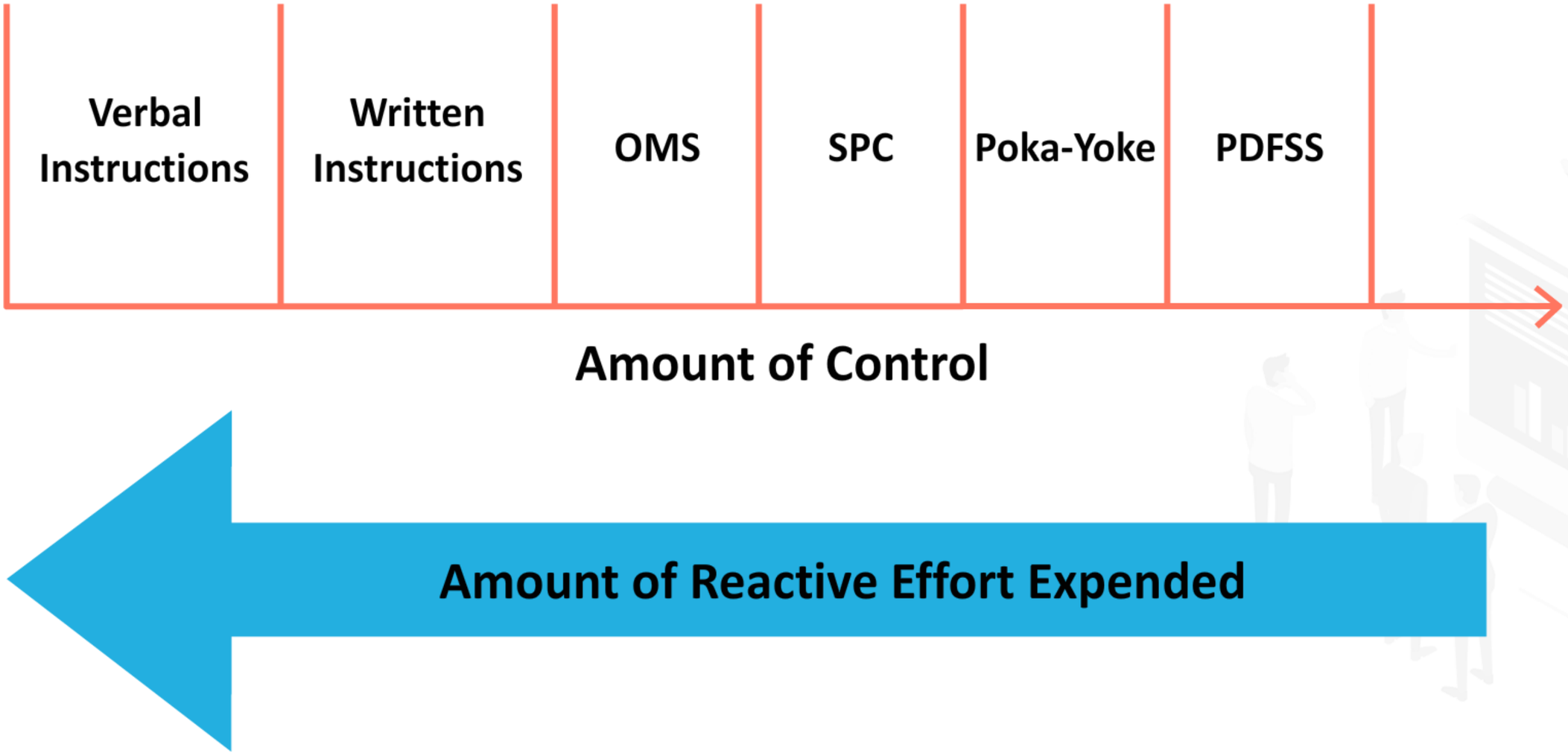
Following are the multiple tools that can be used:

- FMEA
- Special characteristics (critical and significant)
- Control plans or lessons learned from similar parts or processes
- Technical documentation
- Validation plan results
- Optimization methods
- Team knowledge of the process

Developing a Control Plan

- What do you want to control?
- How often do you need to measure the process?
- Do you have an effective measurement system?
- What is the cost of sampling?
- How much shift can you tolerate?
- Who needs to see the data?
- What type of tool or chart is necessary?
- Who will generate the data?
- Who will control the process?
- What are the system requirements for auditing and maintenance?

Level of Control



Transactional Control Plan

TRANSACTIONAL CONTROL PLAN

Prepared By :
Approved By :
Process Owner :

Business Unit : Nutri Worldwide Inc.
Location :
Department : Prototype/Purchase

Page : 1 of 1
Document No.: 4
Revision Date : 06-18-2014
Supersedes :

Process Step	Characteristic/ Parameter	CTQ/CL	Specification/ Requirement	Measurement Method	Sample Size	Frequency	Who Measures	Where Recorded	Decision Rules/ Corrective Action	Reference Number
Purchase Order	Time of entry	CTD	Customer order entry to PO less than 3 days	Access database server Time stamp	All entered	Weekly	Admin.	Access database	1. Review reason for length (Ex: Weekend error) and determine need to solve problem	

Manufacturing Control Plan

Part Name/Family:		Prepared by:		Page:				
Part No.:		Approved by:		Document No.:				
Plant/Area:				Revision Date:				
Process Step	Characteristic/ Parameter	CTS	Specification/ Requirement	Measurement Method	Sample Size	Frequency	Who Measures	Where Recorded	Decision Rules/ Corrective Action
Injection Molding (Machine #16)	Y : Part Dimension	CT Q	3.250 + 0.005 in Cpk = 2	Gage # 042	5	Each hour	Operator	X and R Chart	If out-of-control condition appears, 100% inspect all parts since last check. If X is out-of-control, adjust injection pressure. If R is out-of-control, adjust coolant flows.
"	X : Cavity Pressure	CTQ	1200 + 15 psi Cpk = 2	Pressure transducer in cavity	5	(automatic, continuous reading)		X and R Chart	If out-of-control condition appears, check: Injection pressure settings; Temperature controller.
"	X : Coolant Flow	CTQ	5 gal/minute	Flow meter on machine	1	Each hour	Operator	Check Sheet by Machine	If flow is in yellow zone, then adjust it to green zone. If flow is in red zone, 100% inspect all parts since last check and adjust flow to green zone.

IT/ITES Control Plan

Process Step	What's Controlled	Input or Output	Spec. Limits/ Requirement	Measurement Method	Control Method	Sample Size	Frequency	Who/What Measures	Where is it Recorded	Decision Rule/ Corrective Action
Plan review for critical code	Critical code details in project plan	Input	100% Critical Code	Project Plan	Weekly project management reviews	100%	Weekly	Project Manager/ Automated workflow for project management	Project database	Escalation to the Account Manager and update project plan
Conduct review for Critical Code	Critical code	Input	100% Critical Code	Project Plan	Weekly project management reviews	100%	Weekly	Project Lead/ Automated workflow for project management	Project database	First-level escalation to project manager and second-level escalation to account manager
Conduct review for Critical Code	Critical code	Output	100% Critical Code	Project Plan and Code review reports	Project manager signs off code review reports	100%	Per project plan	Project Lead / Code control database	Project database/ source code database	First-level escalation to project manager and second- level escalation to account manager

Key Takeaways

- Control plan is a written summary description of the system for controlling a process.
- There are two different types of countermeasures: corrective actions and preventive actions.
- Cost-benefit analysis is used to evaluate the total anticipated cost compared to the total expected benefits.
- Some popular tools to develop and execute control plans include Control charts, MSA, Error-proofing, SOP, and PM.

Knowledge Check

Knowledge Check

1

Which of the following is NOT a correct use of control plans?

A. Monitoring key output variables

B. Monitoring key input variables

C. Controlling the process

D. Identifying key input variables

Knowledge Check

1

Which of the following is NOT a correct use of control plans?

A. Monitoring key output variables

B. Monitoring key input variables

C. Controlling the process

D. Identifying key input variables

The correct answer is **D**

The purpose of control charts is to monitor key process input and output variables to ensure stability and minimize defects. Key variables are not determined using control charts.

Knowledge Check

2

Which method provides the most control?

A. Written Instructions

B. Poka-Yoke

C. Verbal Instructions

D. PDFSS

Knowledge Check

2

Which method provides the most control?

A. Written Instructions

B. Poka-Yoke

C. Verbal Instructions

D. PDFSS

The correct answer is **D**

PDFSS ensures a process is designed to perform as desired and is therefore the strongest form of control.

Knowledge Check

3

The most recent observations indicate a process step is not meeting performance metrics per control plan. What should happen next?

A. Use a different performance metric

B. Go to 100% inspection since last sample

C. Refer to the response plan

D. Notify management

Knowledge Check

3

The most recent observations indicate a process step is not meeting performance metrics per control plan. What should happen next?

A. Use a different performance metric

B. Go to 100% inspection since last sample

C. Refer to the response plan

D. Notify management

The correct answer is **C**

The response plan contains the activities the operator should perform if an out of control condition is realized; therefore, the operator should refer to the response plan.

Knowledge Check

4

A team discovers an issue in its coding operation and has put a temporary solution in place. The temporary solution is an example of _____.

A. Containment

B. Preventative Action

C. Correction

D. None of the above

Knowledge Check

4

A team discovers an issue in its coding operation and has put a temporary solution in place. The temporary solution is an example of _____.

A. Containment

B. Preventative Action

C. Correction

D. None of the above

The correct answer is **A**

Containment acts as a band aid or temporary solution until the root cause is identified.