Anexas Consultancy Services

Welcome to

ANEXAS EUROPE

FAILURE ANALYSIS

CERTIFICATION TRAINING

Introductions and Expectations

Introduce yourself to the group:

- Name
- Job
- Any one thing not many people know about you!
- Expectations for the session

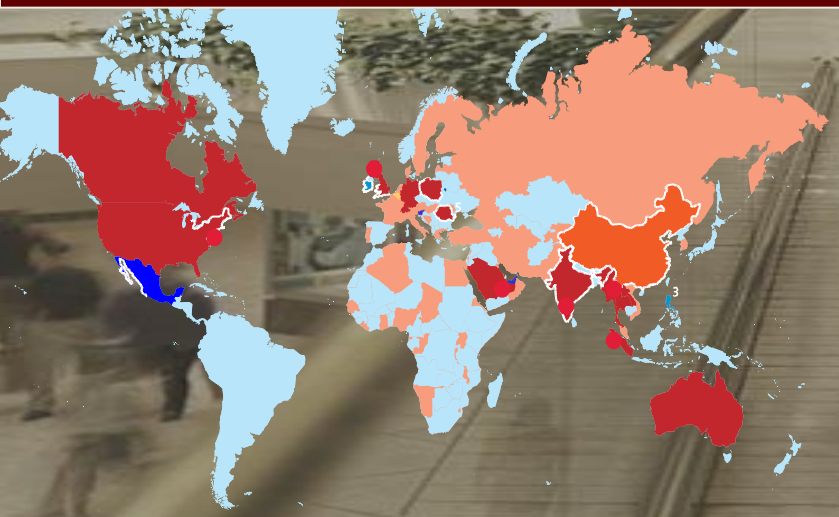
Welcome to Training!

Table of Contents

Table of Contents, cont.

About Anexas

Enabling individuals and organizations achieve excellence since 2006



- Anexas is a global network of IT, AI, ML, lean, six sigma and project professionals serving the wide spectrum of industries. We operate in 10 countries and have 25 professionals in the team.
- Our mission is to help organizations and individuals achieve excellence.
- Trained more than 1,50,000 professionals in AI, ML, Lean and Six Sigma, Project Management and quality related trainings across the world from various industries.
- Professionals certified by Anexas have completed more than 5000 successful projects under our guidance.

Ground Rules

- Be on time
- Start and end on time
- Take a spelling holiday
- Participate, don’t spectate
- Track issues and admin questions for later on the parking lot
- CLASSROOM TRAINING
  - Don’t conduct any side-conversations
  - It’s OK to stand up and stretch
  - Turn off your cell phones or set them on vibrate
  - Conduct business at breaks and lunch
- Have fun!

Administrivia

- Please log into Anexas LMS (learning management system)
- Follow the steps sent to you in the mail.
- You can share your experiences related to tools with the group

All the videos shown in the training are available in LMS

Subscribe to Anexas Youtube channel to get additional resources

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Chapter 1:
Course Overview

1990 - 2000

- A Chemical Engineer
- MBA (Finance)
- Working in 12 hr/day shift
- An amateur poet
- Worked in petrochemical companies

2002

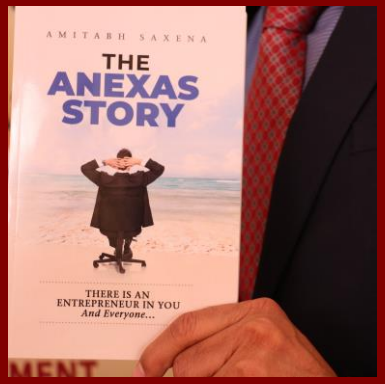
- Completed Black Belt certification
- Went to Europe
- Completed a project

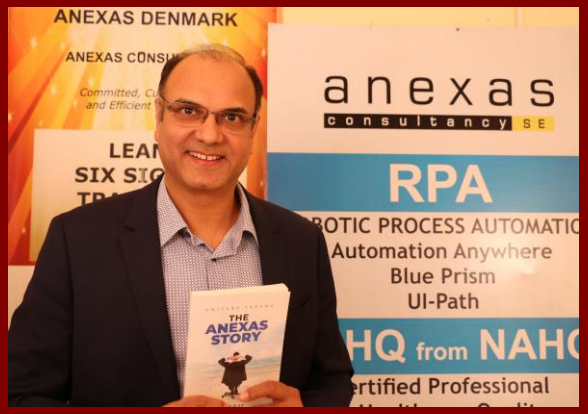
Amitabh Saxena

- Lean Six Sigma Master Black Belt
- Data Scientist
- PMP, CPHQ
- 33 years industry experience
- Consulted more than 200 organizations including 15 Fortune 100 companies
- Trained more than 150,000 professionals
- Author of 2 books, Poet
- Father of 2 college going kids and husband to a Pediatrician

Amitabh Saxena

- Guided more than 1000 projects in multiple domains
- Speaker in reputed conferences like ASQ, IQPC, HMA
- Successful entrepreneur running a Lean Six Sigma company
- Newspaper articles, TV Shows
- Co-Chair of IT experts committee of Bangalore Chamber of Industry and Commerce





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Chapter 2: Introduction to Anexas

Objectives

- To introduce you to Anexas Consultancy Services
- Introduce the benefits available to Anexas alumni
- Project support details
- Certification process

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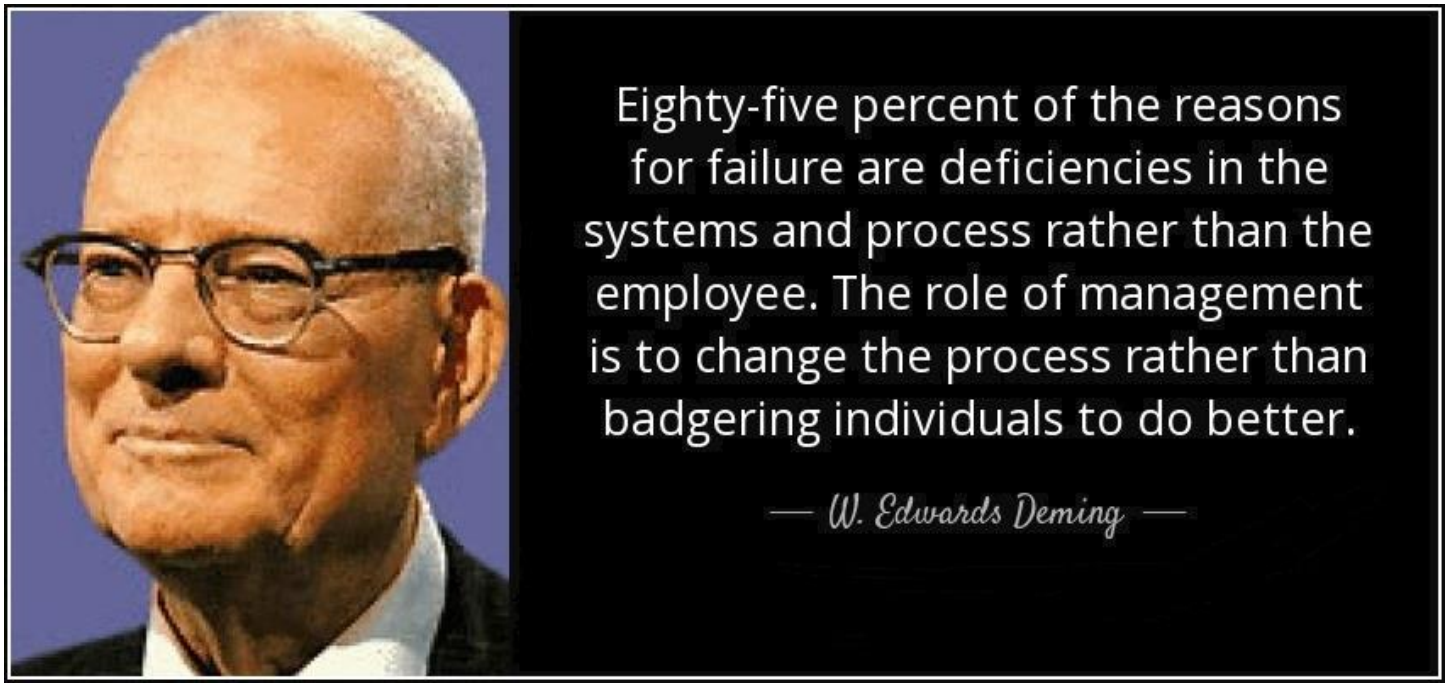
Chapter 3:
Data Types

Attitude and Discipline

- Customer Focus
  - View Quality externally from the customer's perspective
  - Measure the same way that the customer does
- Meet customer expectations every time
  - Continuous improvement cycle
    - Systematic
    - Scientific
    - Fact-based
    - Data-driven

Edward Deming



- It is difficult to improve if you cannot measure.
- In God we trust, rest others bring data.

Can you measure everything?

Data Types: Continuous and Attribute (Discrete)

- Continuous Variables
  - Can be measured on a continuous scale:
    - Cycle Time (hours)
    - Length (inches)
    - Temperature (F)
    - Pressure (PSI)
    - Revenues (US$)
    - Procurement Time (days)
    - Cholesterol (mg/dL)
    - Age (years)
    - Height (cm)
    - Weight (Kg)
- Attribute (Discrete) Variables
  - Difficult to measure, only observed, counted, or verified
    - Number of defective services
    - Percent of nonconforming product or service
    - Number of customer complaints
    - Customer satisfaction on a scale from 1 to 10

Analyze Summary (Summary)

Analyze

Process Door

- As-is process map
- Gemba walk
- Value Added and Non Value Added Analysis

Data Door

- Cause and Effect Diagram
- Control Impact Matrix
- Pareto Chart
- Box Plots and Scatter Plots

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Chapter 4:
Identifying Causes

Cause and Effect/Ishikawa/Fishbone

5 Why Analysis

Root Cause Analysis

Above the surface you see the

Symptoms

of the problem

Dig deeper to find the

Root Cause

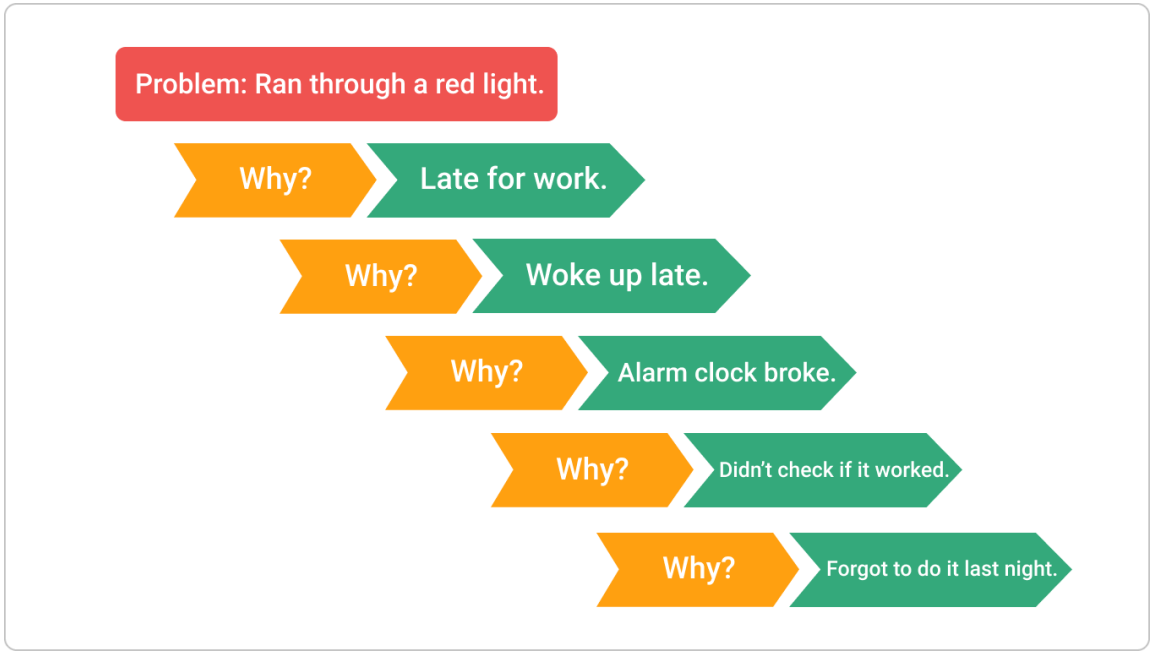
of the problem

Brainstorming Potential Causes

- Purpose: Brainstorming is a method of generating lots of ideas quickly by:
  - Encouraging creativity
  - Involving everyone
  - Generating excitement and energy
  - Separating people from ideas they suggest

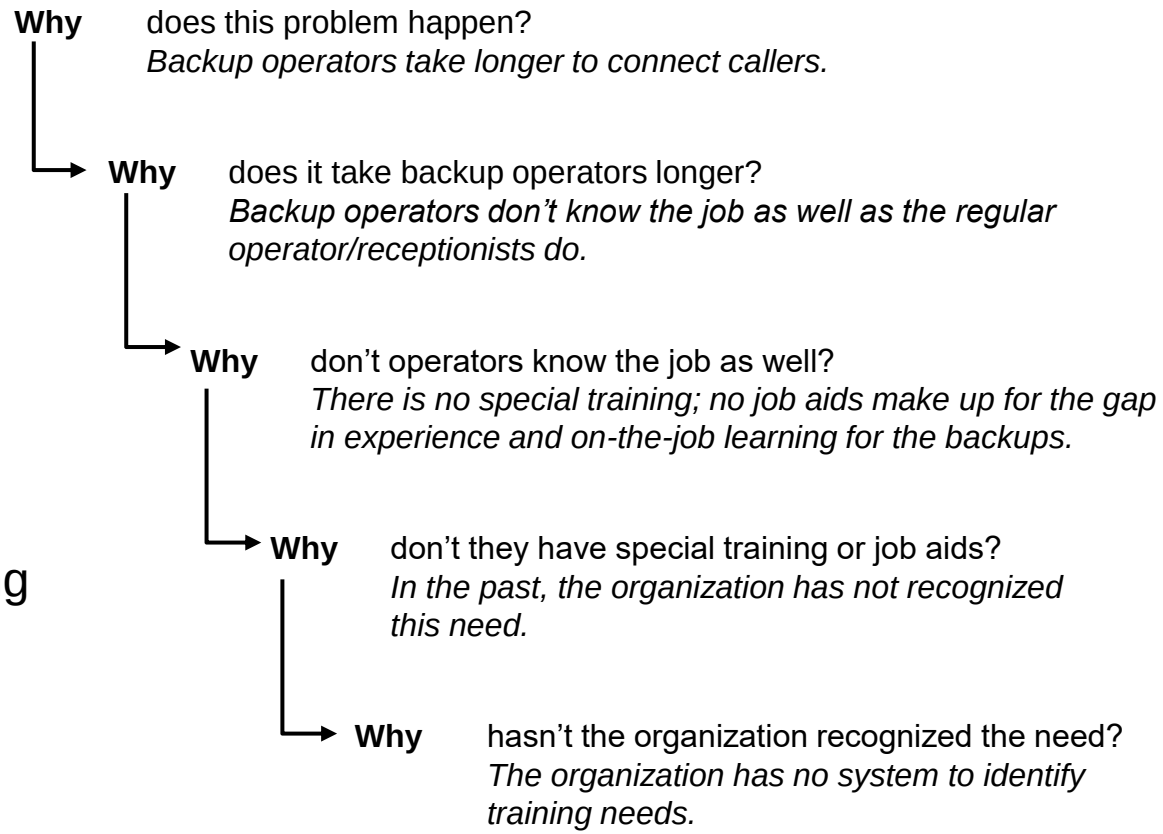
Brainstorming Potential Causes, cont.

- Uses in ANALYZE:
  - Use brainstorming to generate a lot of potential causes of the problem you defined in MEASURE:
    - Use “why-why” to push for root causes
    - The key question is “Why does that happen?”



The Why-Why Technique

- To push for root causes, start with your focused problem and then ask “Why” several times
- Example:
  - Focused problem: Customers complain about waiting too long to get connected to staff during lunch hours



Verify each assumption on the spot—where the activity in question is taking place

5 why analysis

The stone on the Jefferson Memorial was crumbling.

1. Why was it crumbling?
   - Too many washings.
2. Why was it washed so often?
   - To remove bird droppings.
3. Why were there so many birds in the building?
   - Abundant food supply of spiders.

4. Why are there so many spiders?
   - Abundant food supply of midges.
5. Why are there so many midges?
   - Every evening at dusk they emerge in a mating frenzy.
   - At the same time the Park Service turns on the lights.
   - The midges are attracted to the lights.

5 why analysis

- Solution
  - Delay turning on the lights till one hour after sunset.
  - The food chain was broken and the birds population dropped 90%.
  - The frequency of washings is reduced dramatically.

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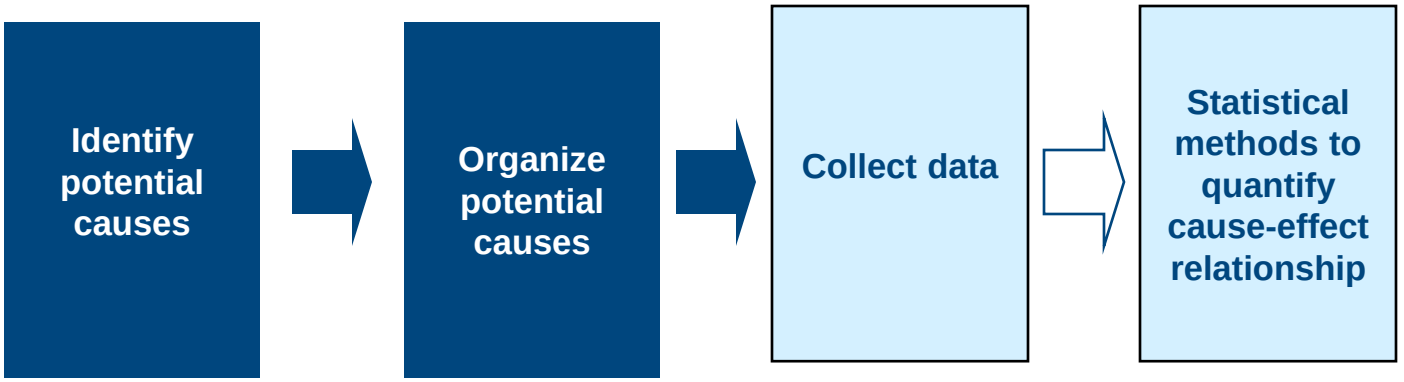
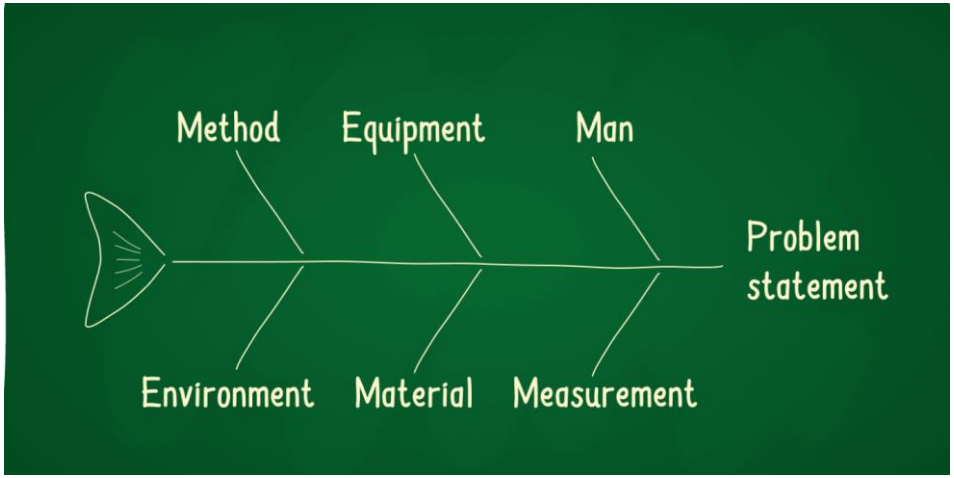
Organizing and Prioritizing Potential Causes



Looking for Relationships

- Graphic displays can help you structure possible causes to find relationships that will shed new light on your problem

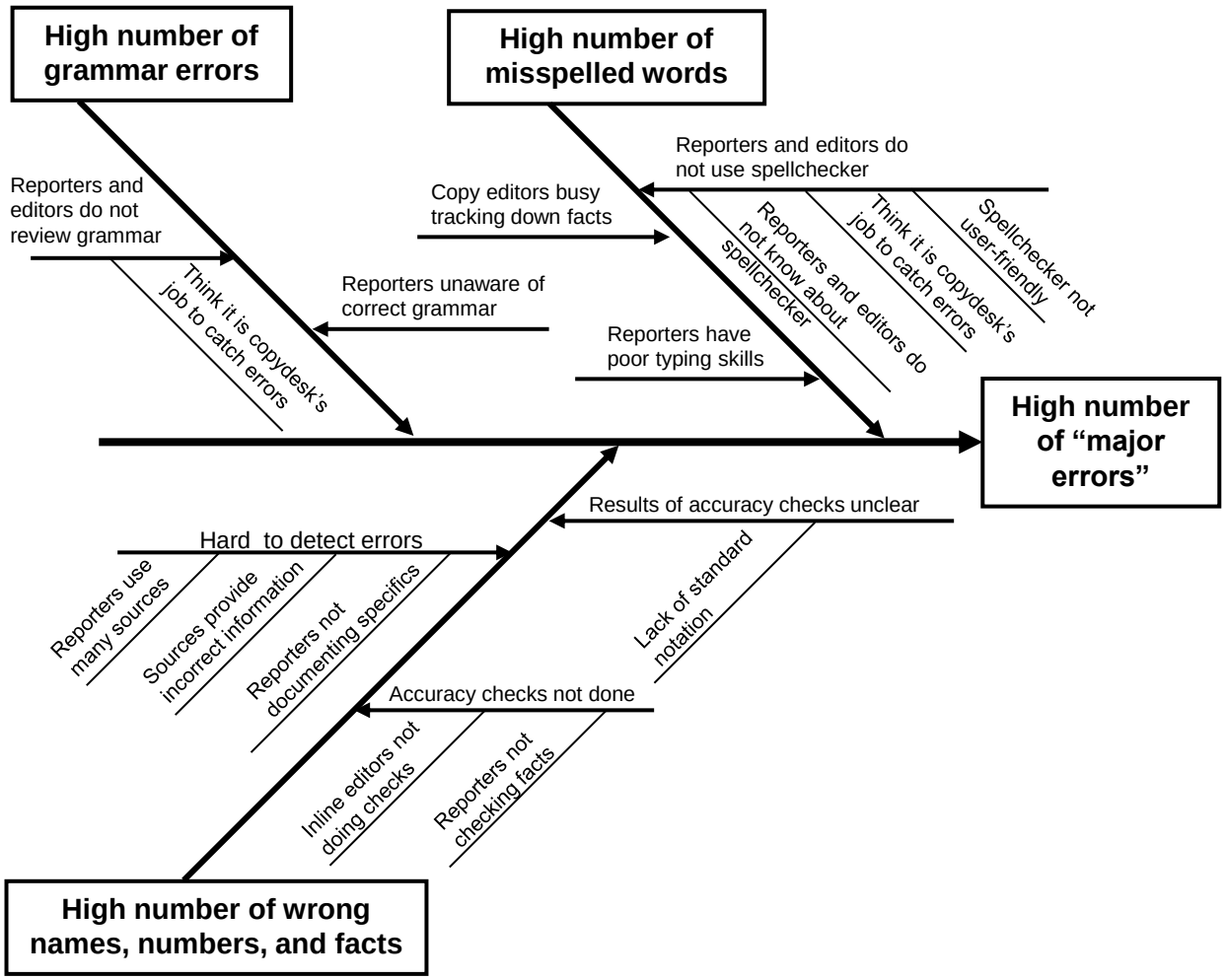
Cause-and-Effect Diagram



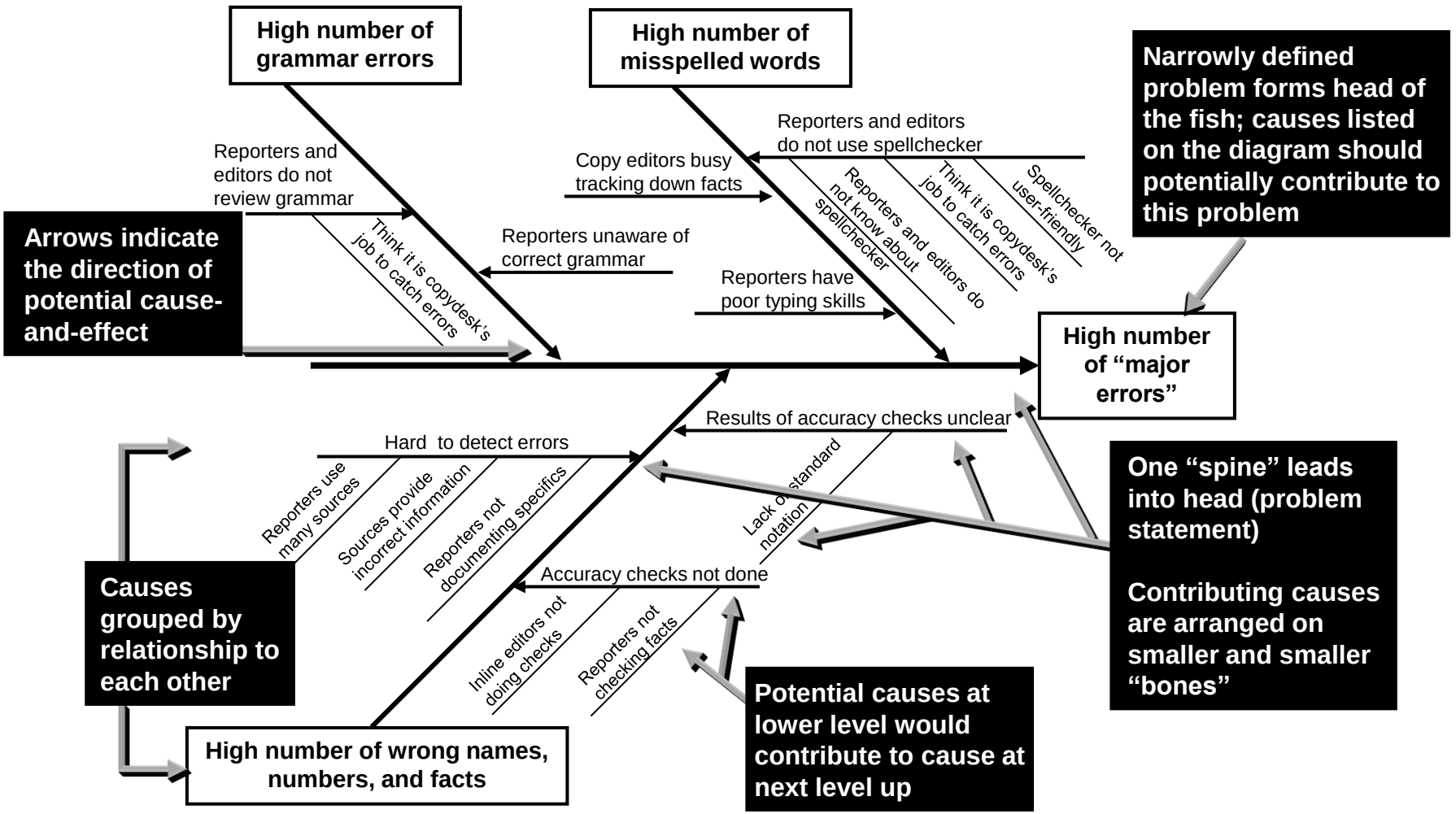
Video is available on
https://youtu.be/MTDWgv_f7s8?si=0oyiZpEGuOgSEHcp

Cause-and-Effect Diagram Definition

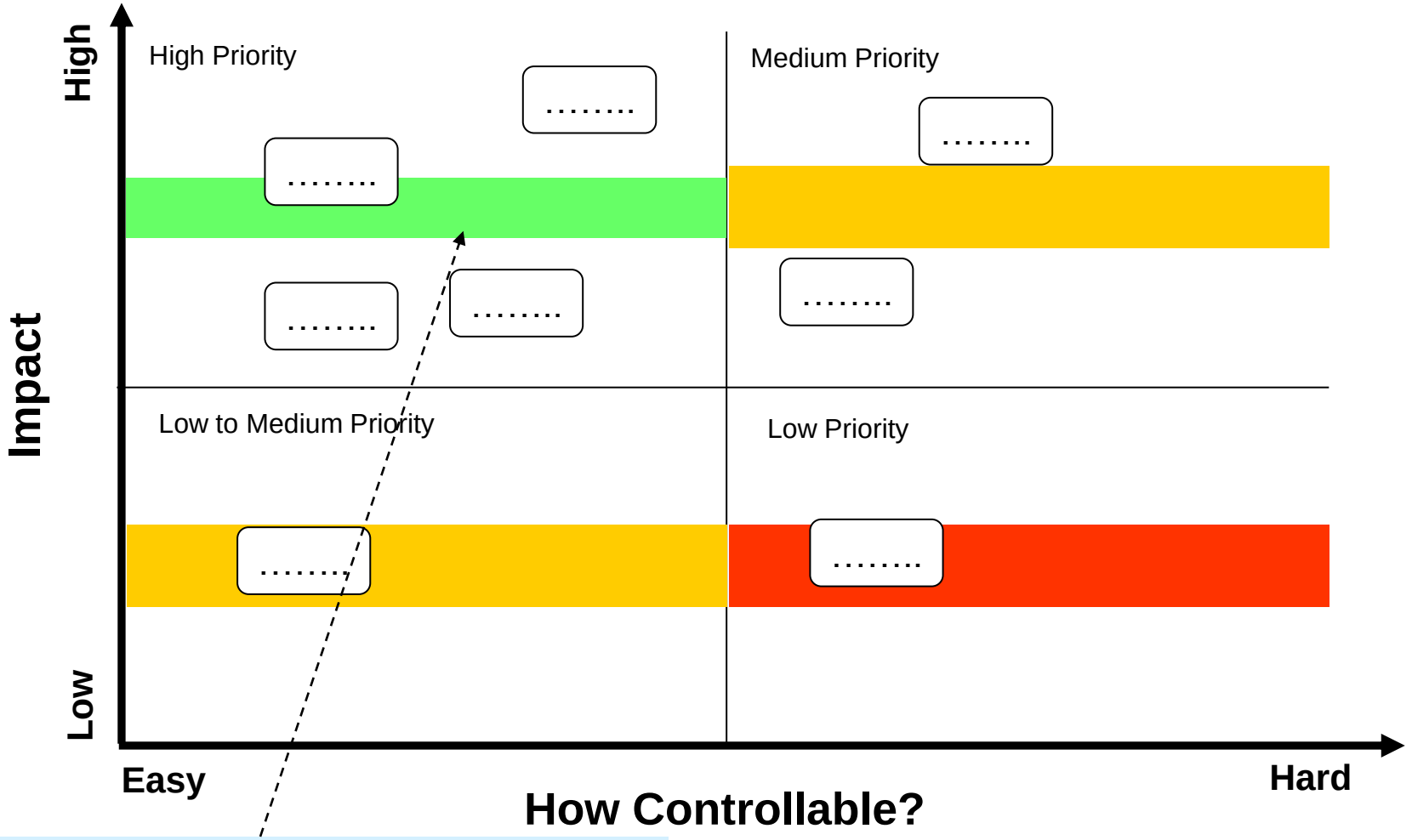
- Cause-and-effect diagrams graphically display potential causes of a problem
- The layout shows cause-and-effect relationships between the potential causes



Cause-and-Effect Diagram Features



Prioritizing Input Variables



Focus on low-effort high-impact items

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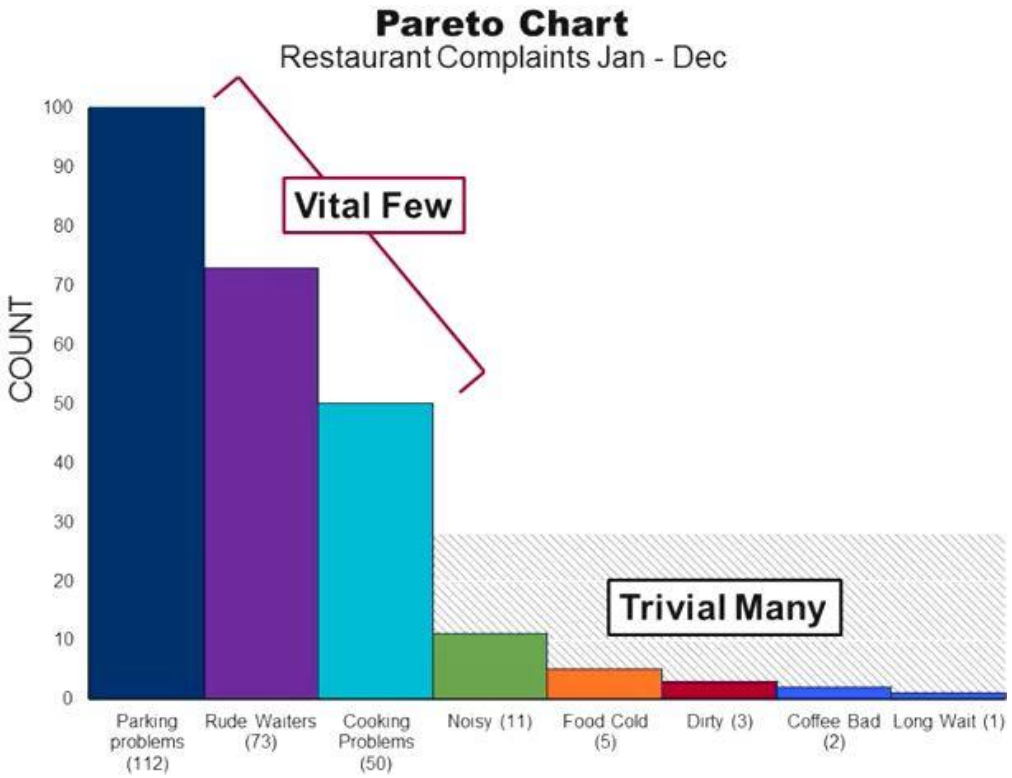
Chapter 5:
Pareto Analysis

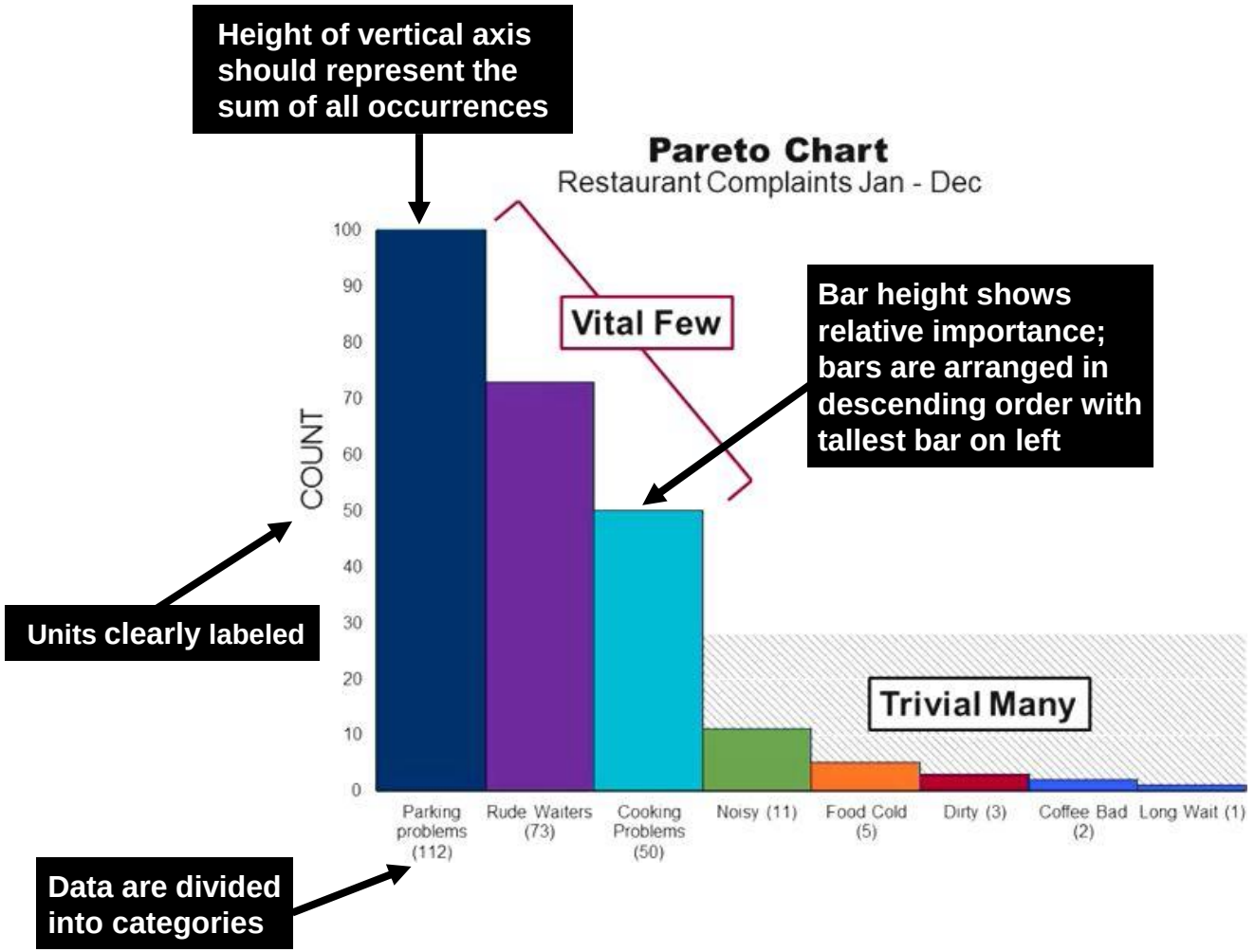
Pareto Charts Definition

A Pareto chart is a graphical tool that helps you break a big problem down into its parts and identify which parts are the most important



Refer to the Minitab training material page number 43,44,45,46

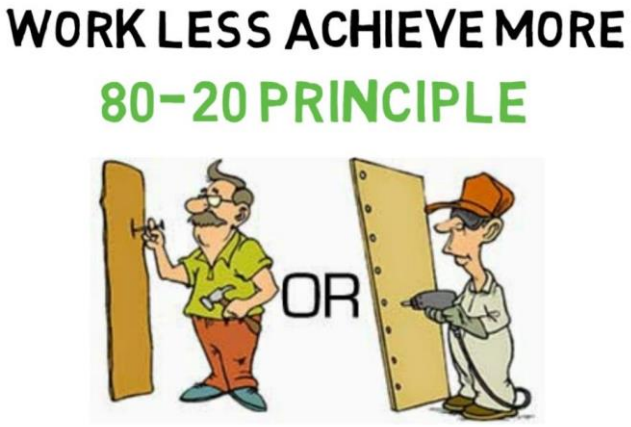
Pareto Charts Definition



Refer to the Minitab training material page number 43,44,45,46

Pareto Charts: Uses

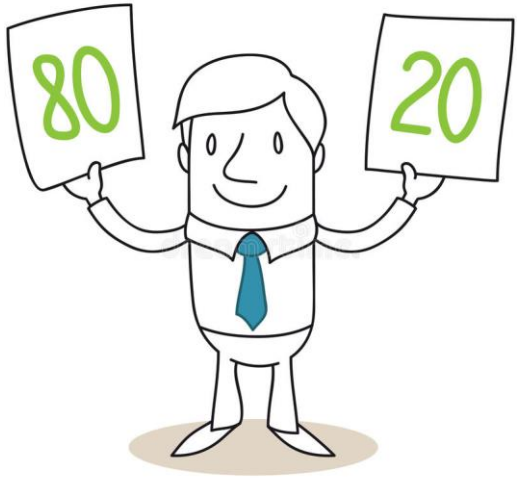
- Understand the pattern of occurrence for a problem
- Judge the **relative impact** of various parts of a problem
- Track down the biggest contributors to a problem
- Decide where to focus efforts



Refer to the Minitab training material page number 43,44,45,46

The Pareto Principle

- The Pareto principle, often called the “80/20 rule,” says that, in many situations, roughly 80% of the problems are caused by only 20% of the contributing factors
- The Pareto principle implies that we can frequently solve a problem by identifying and attacking its “vital few” sources



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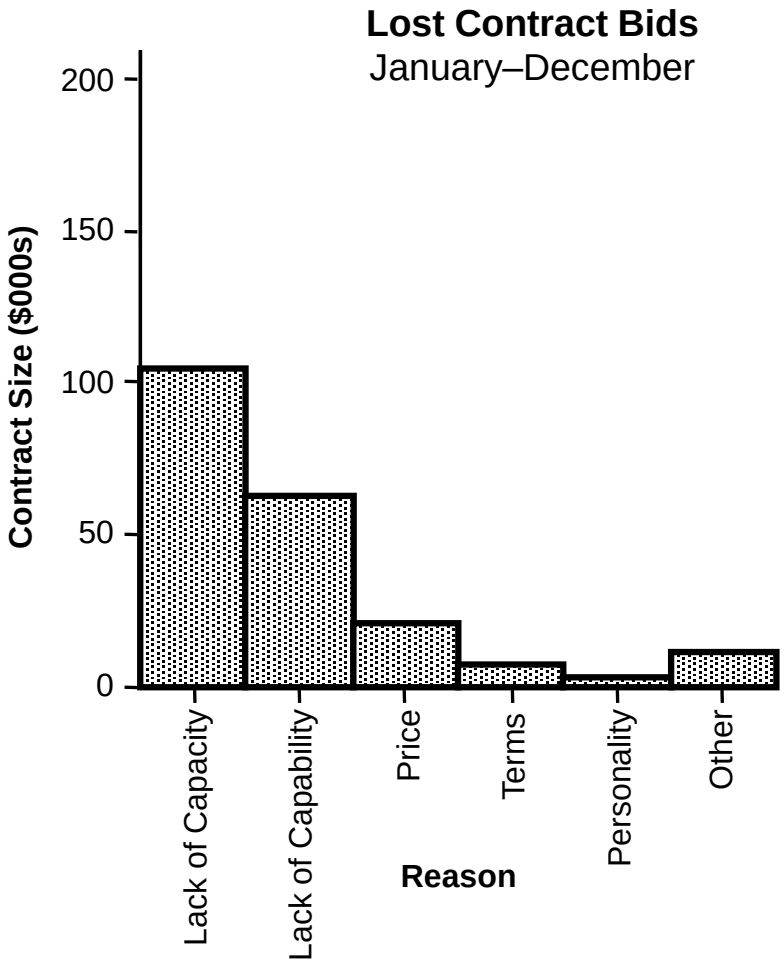
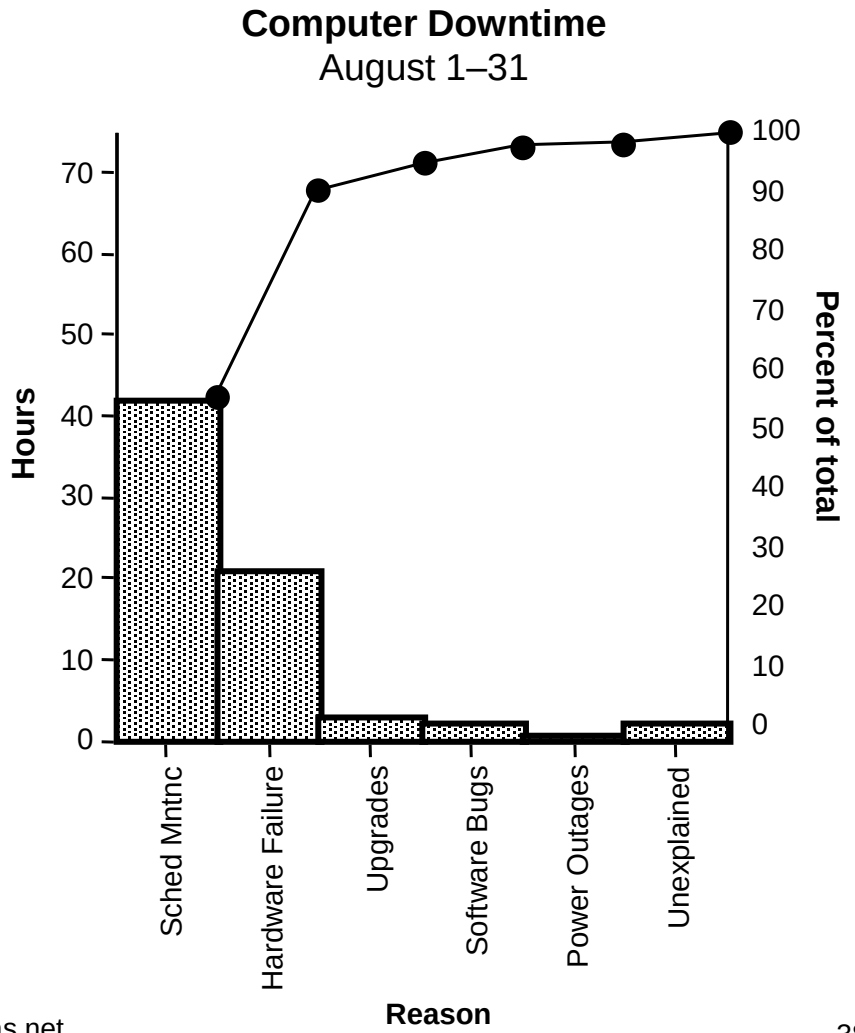
Examples of Pareto Charts





Refer to the Minitab training material page number 43,44,45,46

Identifying Potential Causes: Review

- Start with a narrow problem definition
- Brainstorm ideas
- Arrange ideas on a cause-and-effect or tree diagram
- Use the Effort × Impact diagram to narrow the scope of your investigation

Analyze Phase (Summary)

Analyze

Process Door

- As-is process map
- Gemba walk
- Value Added and Non Value Added Analysis

Data Door

- Cause and Effect/ Tree Diagram
- Effort Impact Matrix
- Pareto Chart
- Box Plots and Scatter Plots

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Chapters 6:
Verifying Causes
Process Analysis

Data Analysis

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Box Plots
Scatter Plots

Data Analysis

Y	X	Analysis
Continuous / Variable Data	Attribute / Discrete Data	Box Plot
Continuous / Variable Data	Continuous / Variable Data	Scatter Plot, Correlation, Regression

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BOX PLOT

A Mix of Attribute (Discrete) and Continuous Data

Discrete X and Continuous Y – Box Plots

C21-T	C22-T	C23	C
Requirements Clarity	Approval Delay	Procurement Time	
Medium	No	121	
Medium	No	125	
Low	No	130	
High	No	123	
High	Yes	122	
Medium	Yes	126	
Medium	Yes	124	
High	Yes	123	
High	No	122	
High	No	119	
Medium	No	124	

Discrete X and Continuous Y – Box Plots

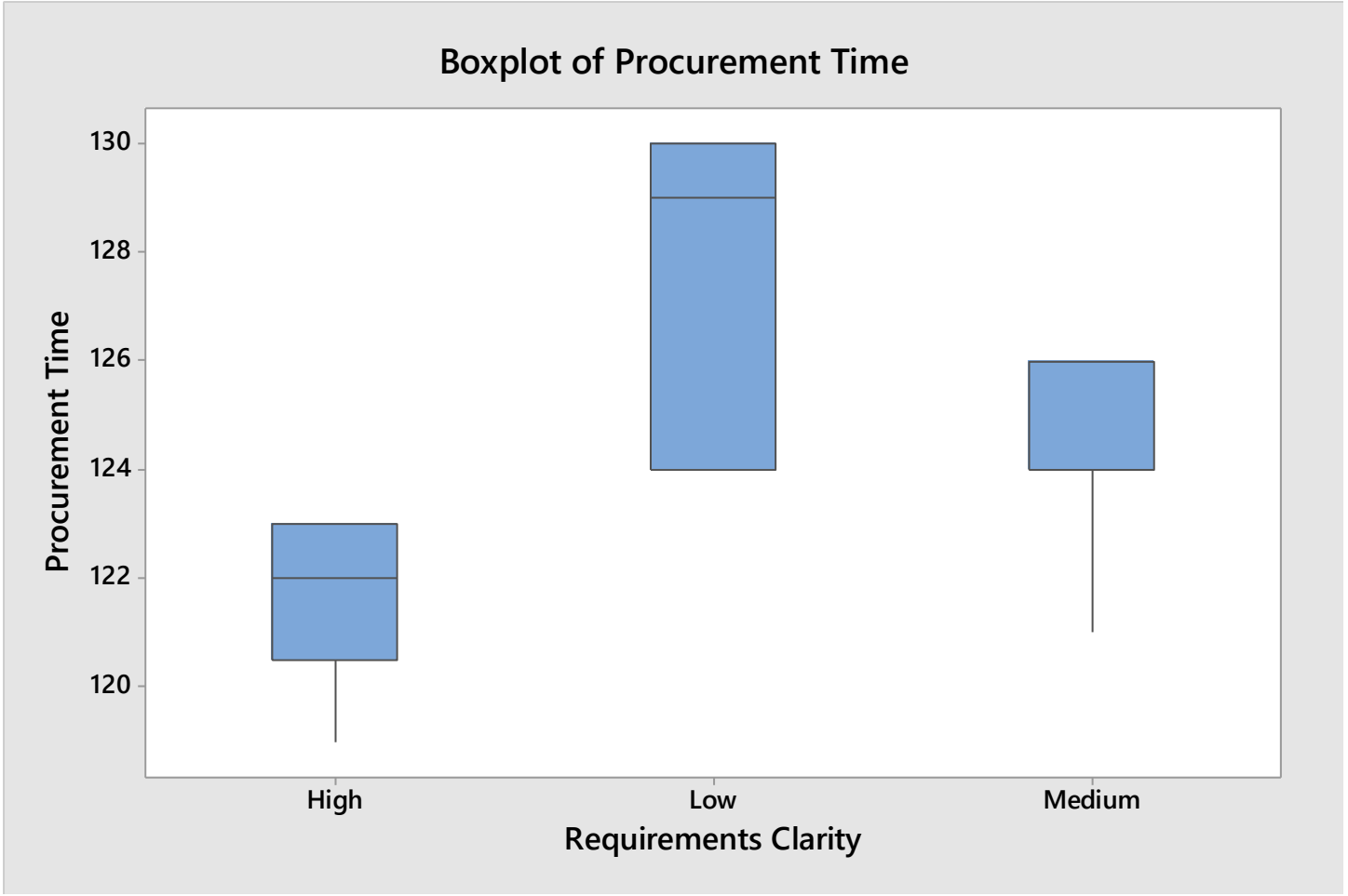
Is Requirements Clarity impacting the Procurement Time?

Y= Procurement Time (Continuous)

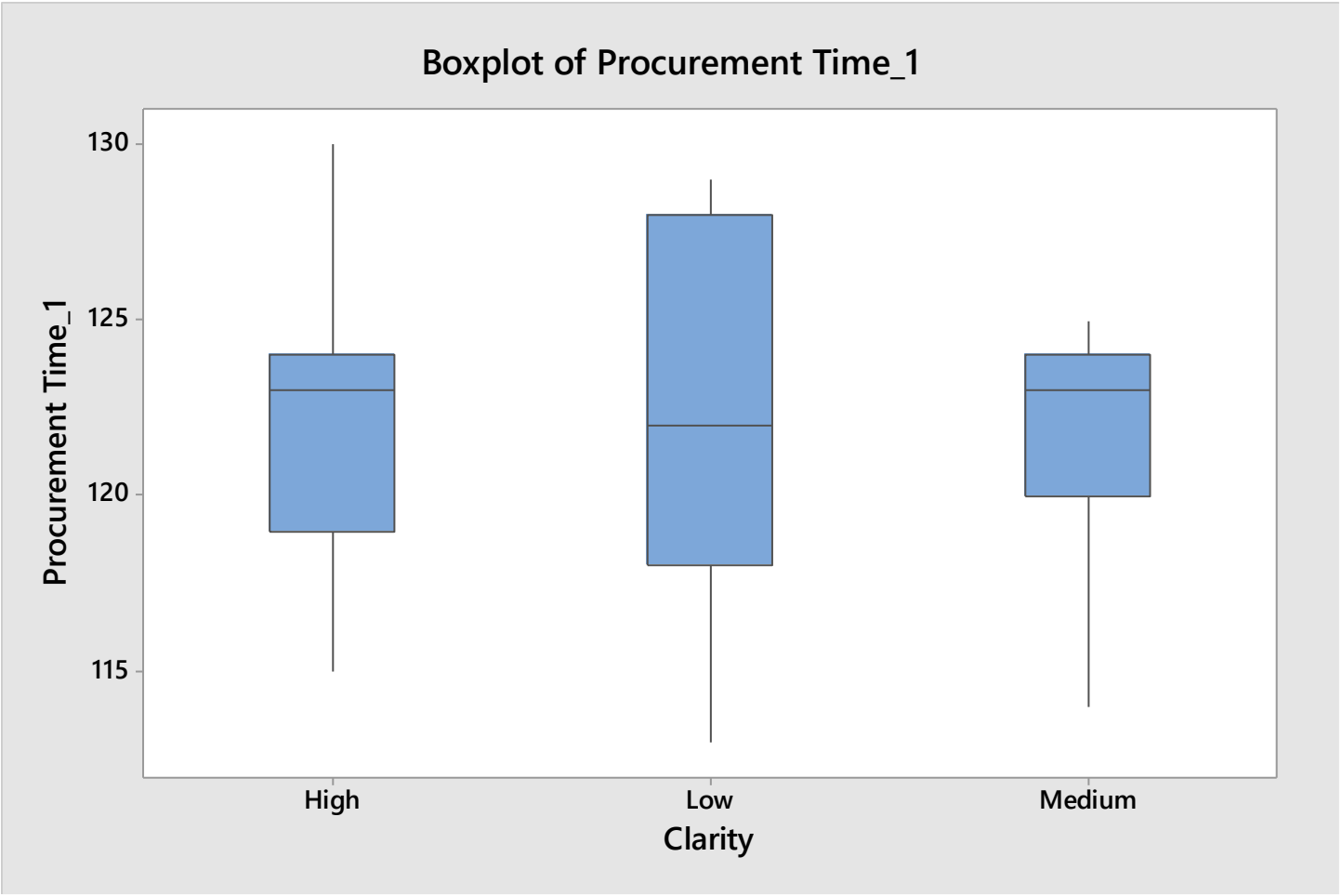
X= Requirements Clarity (Attribute)

Use BOX PLOT

X is the Root Cause



X is Not the Root Cause



Discrete X and Continuous Y – Box Plots

C21-T	C22-T	C23	C
Requirements Clarity	Approval Delay	Procurement Time	
Medium	No	121	
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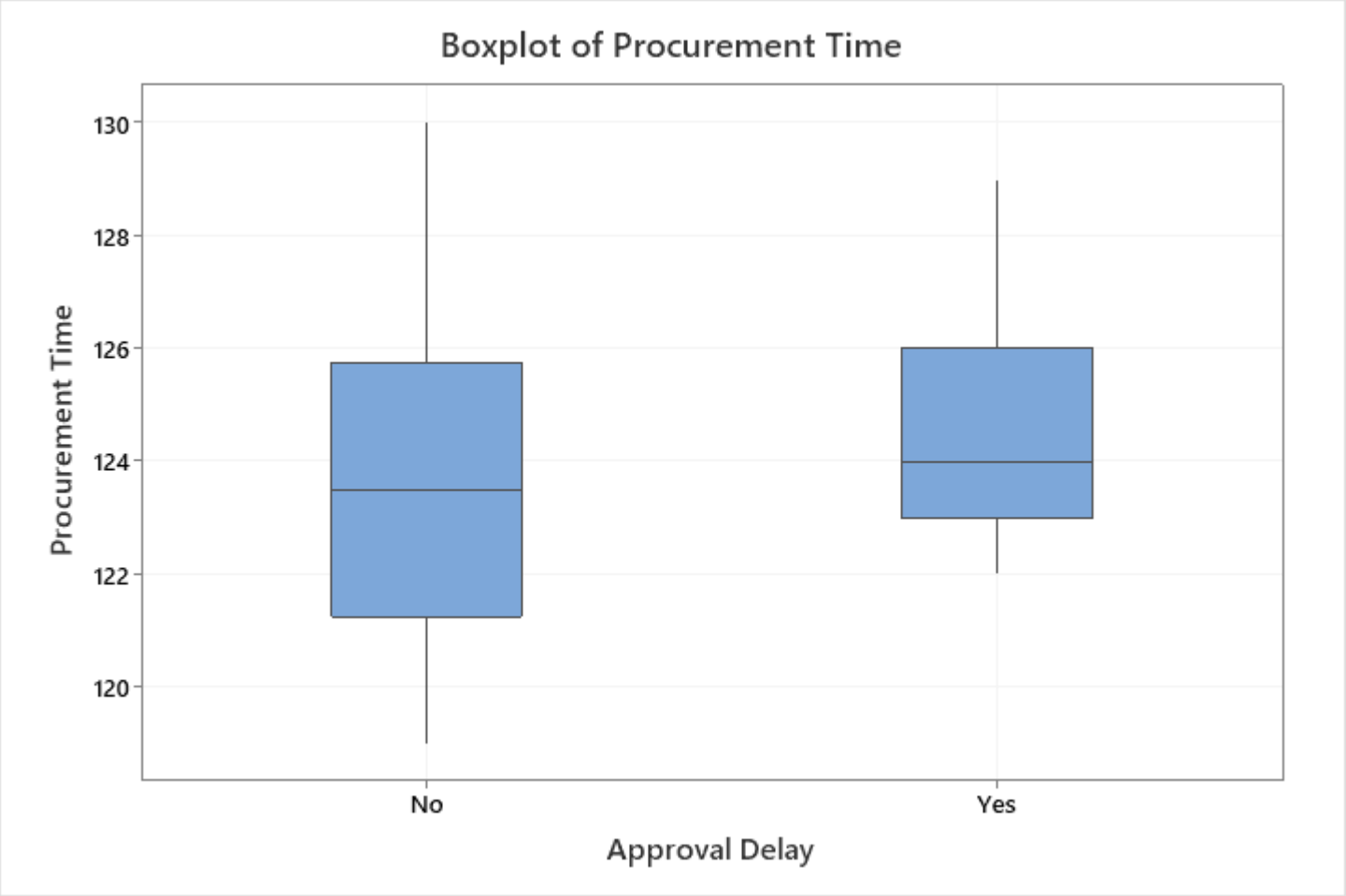
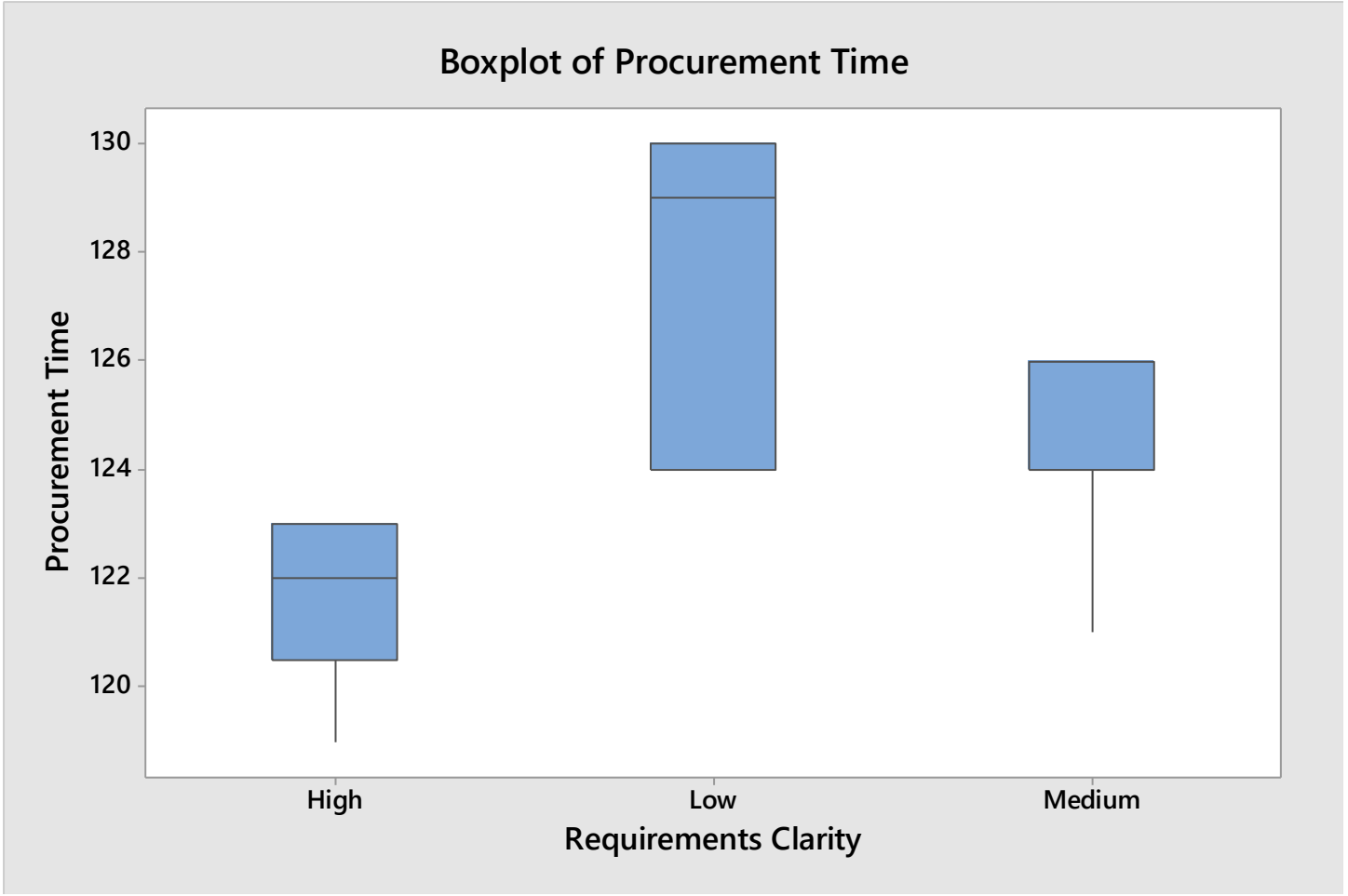
Low	No	130	
High	No	123	
High	Yes	122	
Medium	Yes	126	
Medium	Yes	124	
High	Yes	123	
High	No	122	
High	No	119	
Medium	No	124	

Minitab Follow-Along: Histograms, Dot Plots, and Stratified Box Plots, cont.

Result:

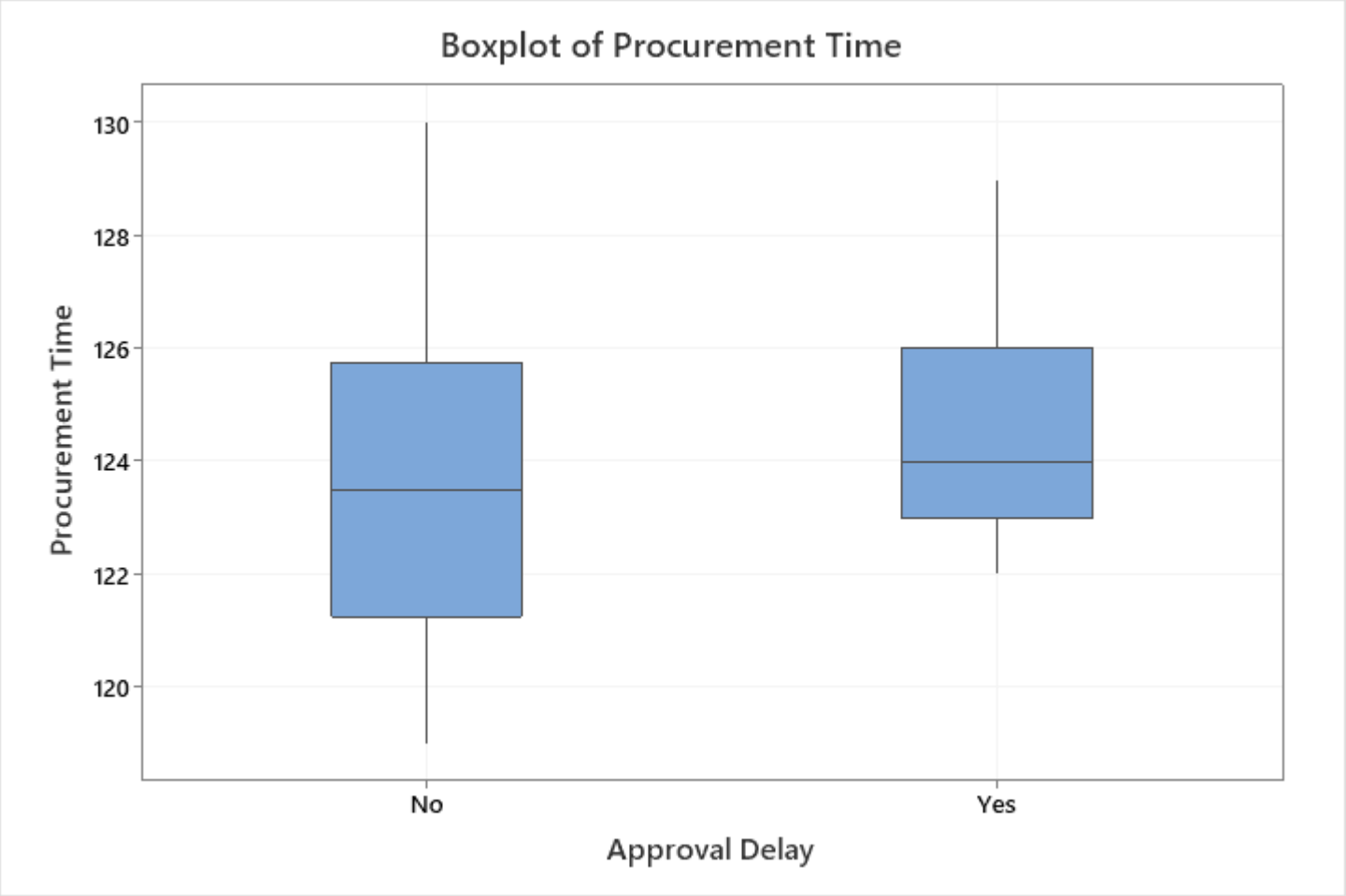


Requirements Clarity is the Root Cause



Approval Delay is not the Root Cause

Result:



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When Both X and Y Are Continuous

Scatter Plots

Continuous X and Continuous Y – Scatter Plots

Boxplot of Procurement Time 1

C19	C20	
Delivery Time	Vendor Selection Time	F
14	3	M
18	4	L
11	5	H
9	3	H
16	4	M
12	5	M
11	3	H

Continuous X and Continuous Y – Scatter Plots

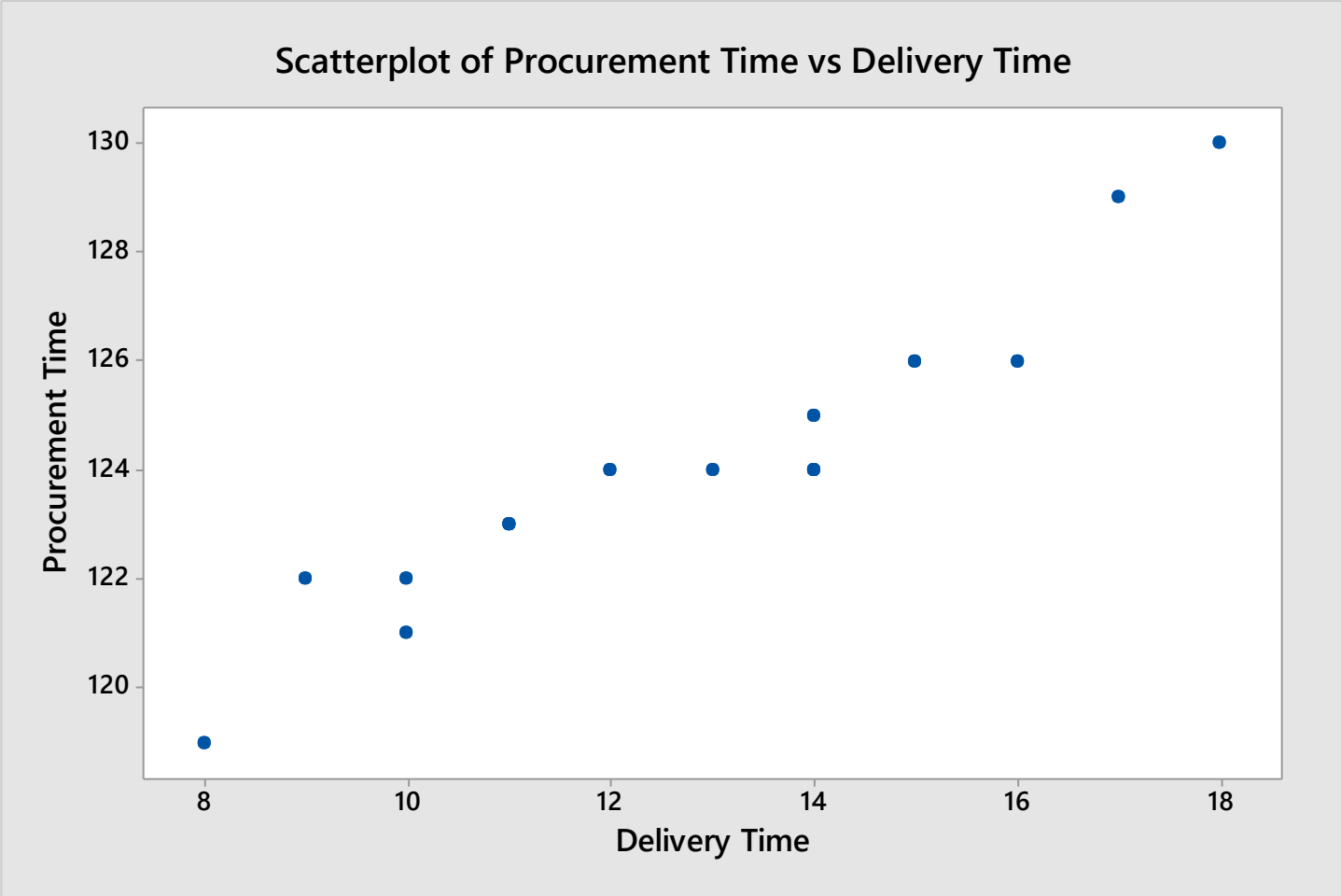
Is Delivery Time impacting the Procurement Time?

Y= Procurement Time (Continuous)

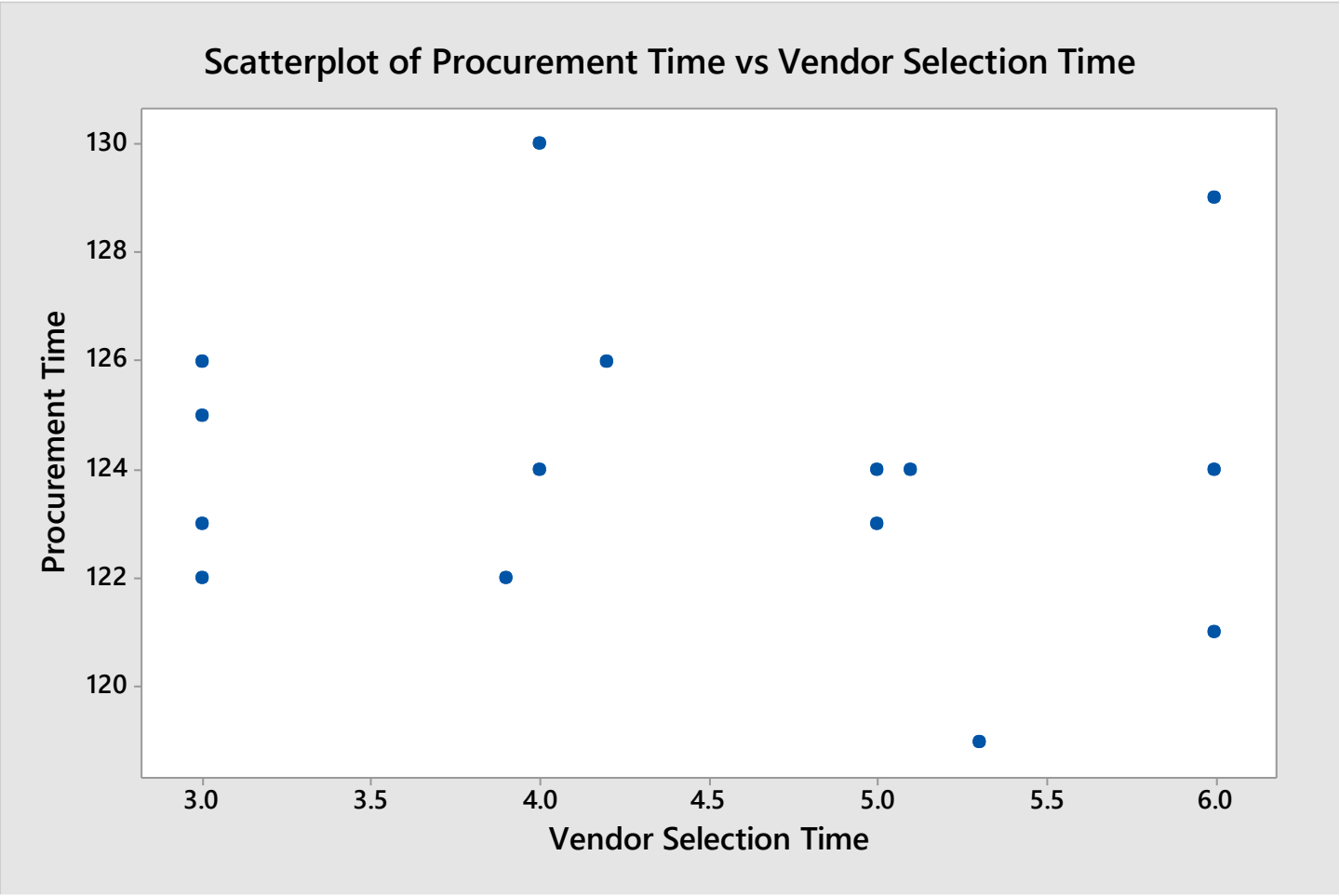
X= Delivery Time (Continuous)

Use SCATTER PLOT

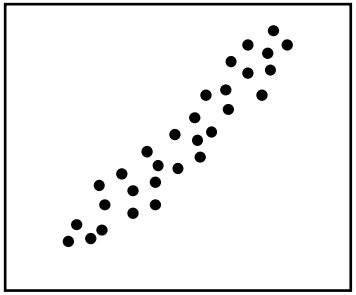
Delivery Time is the Root Cause



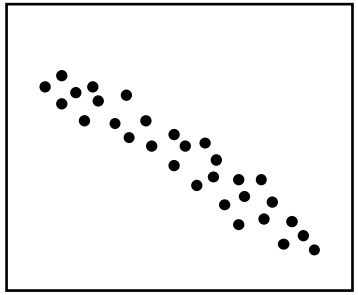
Vendor Selection Time is not the Root Cause



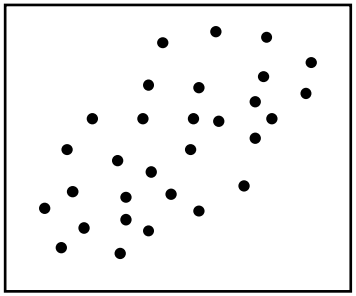
Scatter Plot Patterns



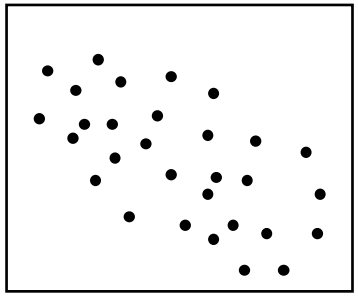
Strong Positive Correlation



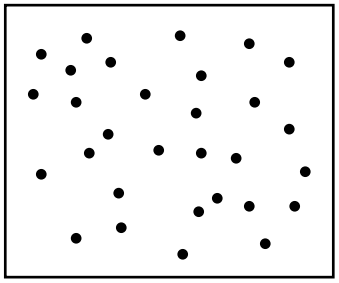
Strong Negative Correlation



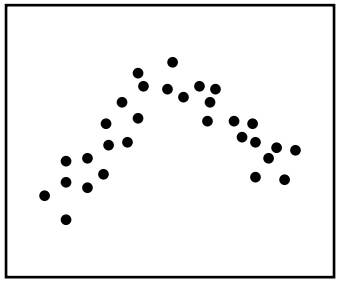
Possible Positive Correlation



Possible Negative Correlation



No Correlation



Other Pattern

Refer to the Minitab training material page number 48 to 50

Analyze Phase (Summary)

Analyze

Process Door

- As-is process map
- Gemba walk
- Value Added and Non Value Added Analysis

Data Door

- Cause and Effect/ Tree Diagram
- Effort Impact Matrix
- Pareto Chart
- Box Plots and Scatter Plots

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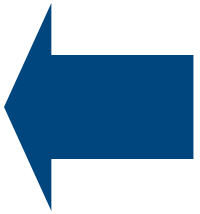
Chapter 7:
Process Analysis (Lean)

Identifying Causes with Process Maps

Process Map Uses

- Process maps are typically used for three reasons:
  - **Understanding** how work is currently performed:
    - Clarifying the steps in a process
    - Building consensus on how a process actually operates
    - Identifying key measurements to be made (in parallel with the data collection plan)
  - **Management** of the work as a part of a process management system
  - **Analysis** of the work for improvement:
    - Identifying potential root causes
    - Uncovering complexity, waste, delays, and inefficiencies
    - Identifying bottlenecks



Two Sorts of Problems

- **Results problems:**
  - Discover the root cause(s) of problems
- **Flow problems:**
  - Identify waste and complexity in the process

Lean Cost Model

PRICE – ↓COST = ↑PROFIT

Traditional Model

Cost + Profit = Sales Price

- Price set by adding profit margin on top of cost
- Few choices for customer
- Customer may not perceive value

Lean Model

Price – Cost = Profit

- Ongoing cost reduction activities
- More choices for customers
- Increase profits
- Possibly lower sales price

Lean Method Model

Traditional Model

In order to increase output:

- Increase the workforce
- Increase working hours

Lean Model

In order to increase output:

- Eliminate all forms of waste as a default strategy
- Focus on efficient use of machines, equipment, and personnel
- Minimize problems with standardized work

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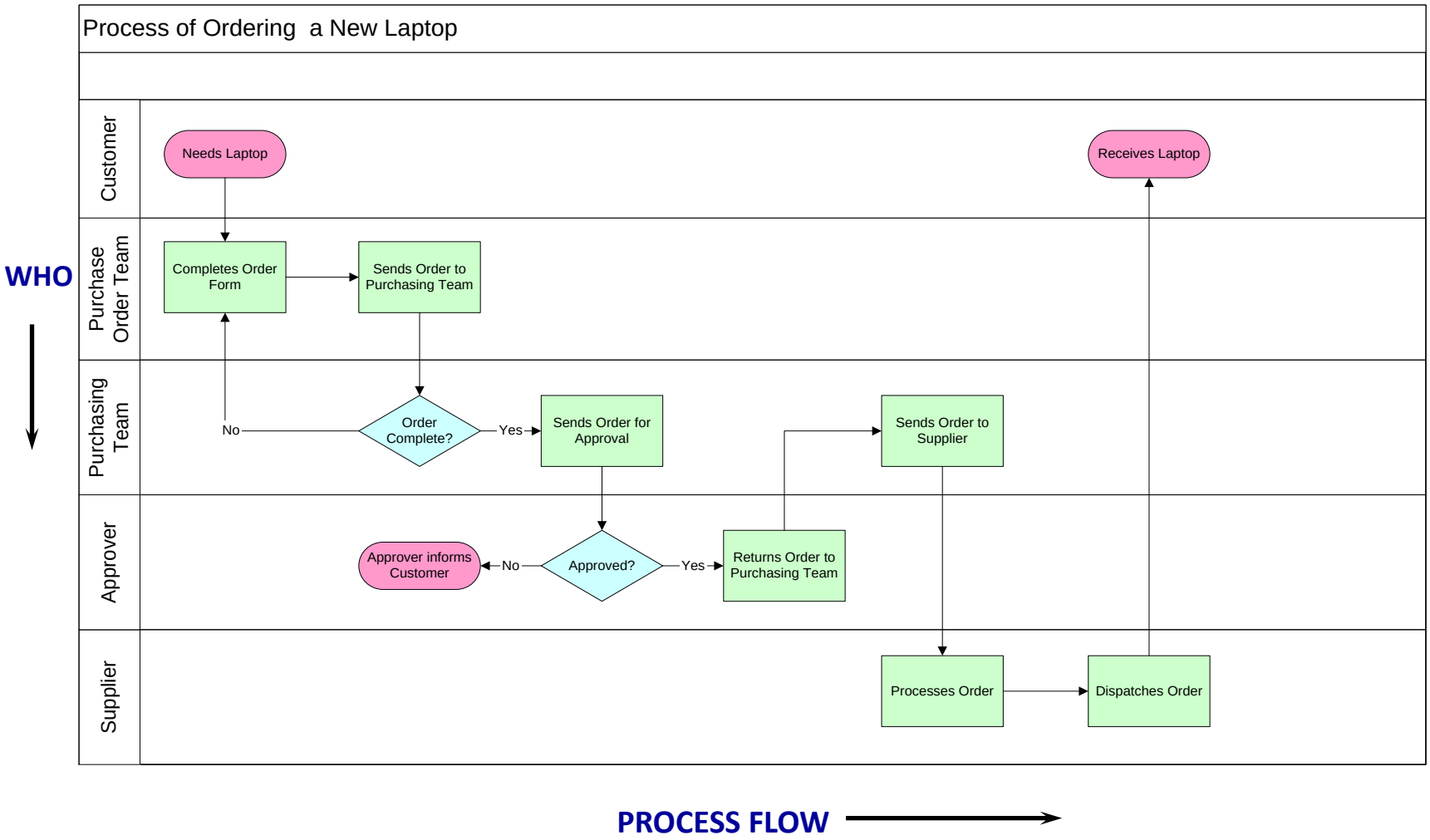
Identify the Value-Added Path

“The Happy Path”

Process Mapping



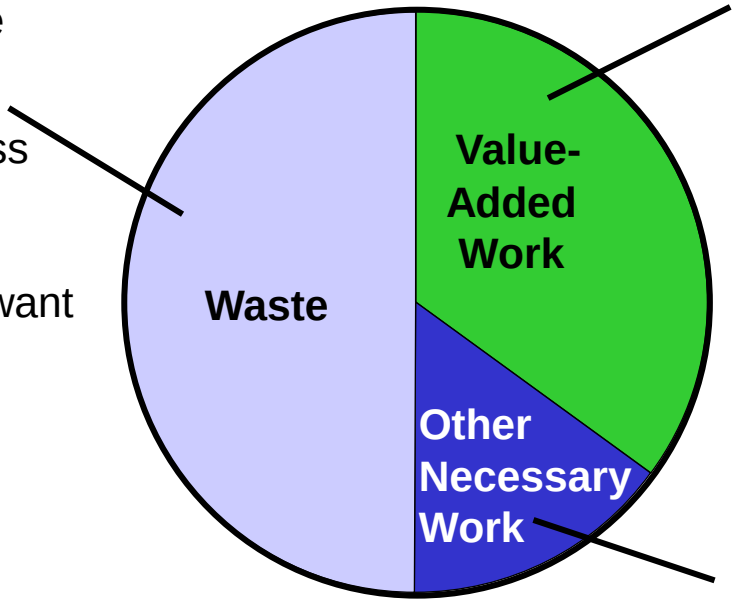
Value-Added and Non-Value-Added Steps

- Value-added steps:
  - Customers are willing to pay for it
  - Physically change the product
  - Are done right the first time
- Non-value-added steps:
  - Not essential to produce output
  - Include:
    - Defects, errors, omissions
    - Preparation/setup, control/inspection
    - Overproduction, processing, inventory
    - Transporting, motion, waiting, delays

Types of Work

- Much of the work done in organizations adds no value to the products or services provided to customers

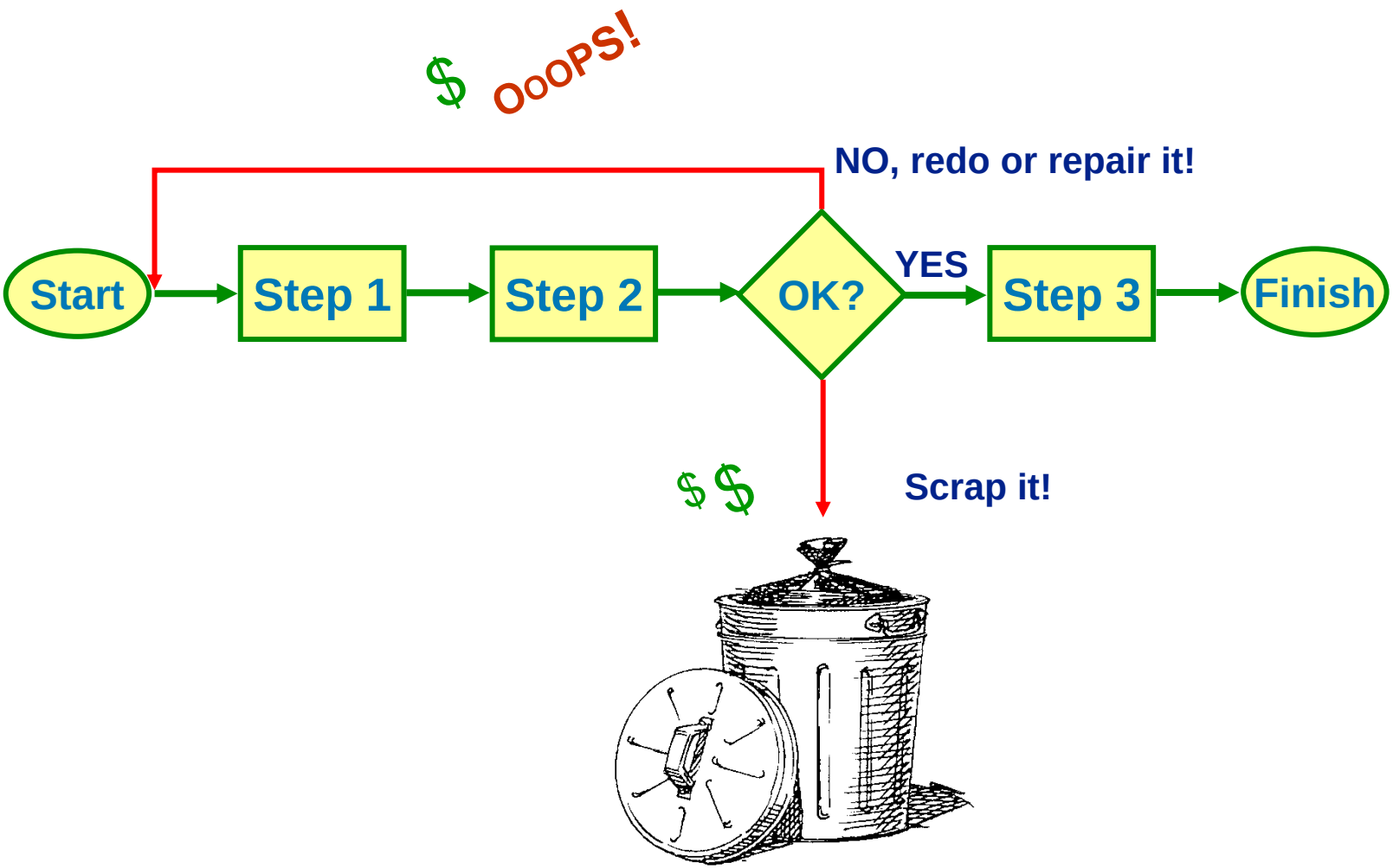
- Should not be done
- Is not necessary to advance the process
- Adds cost
- Customers do not want to pay for it



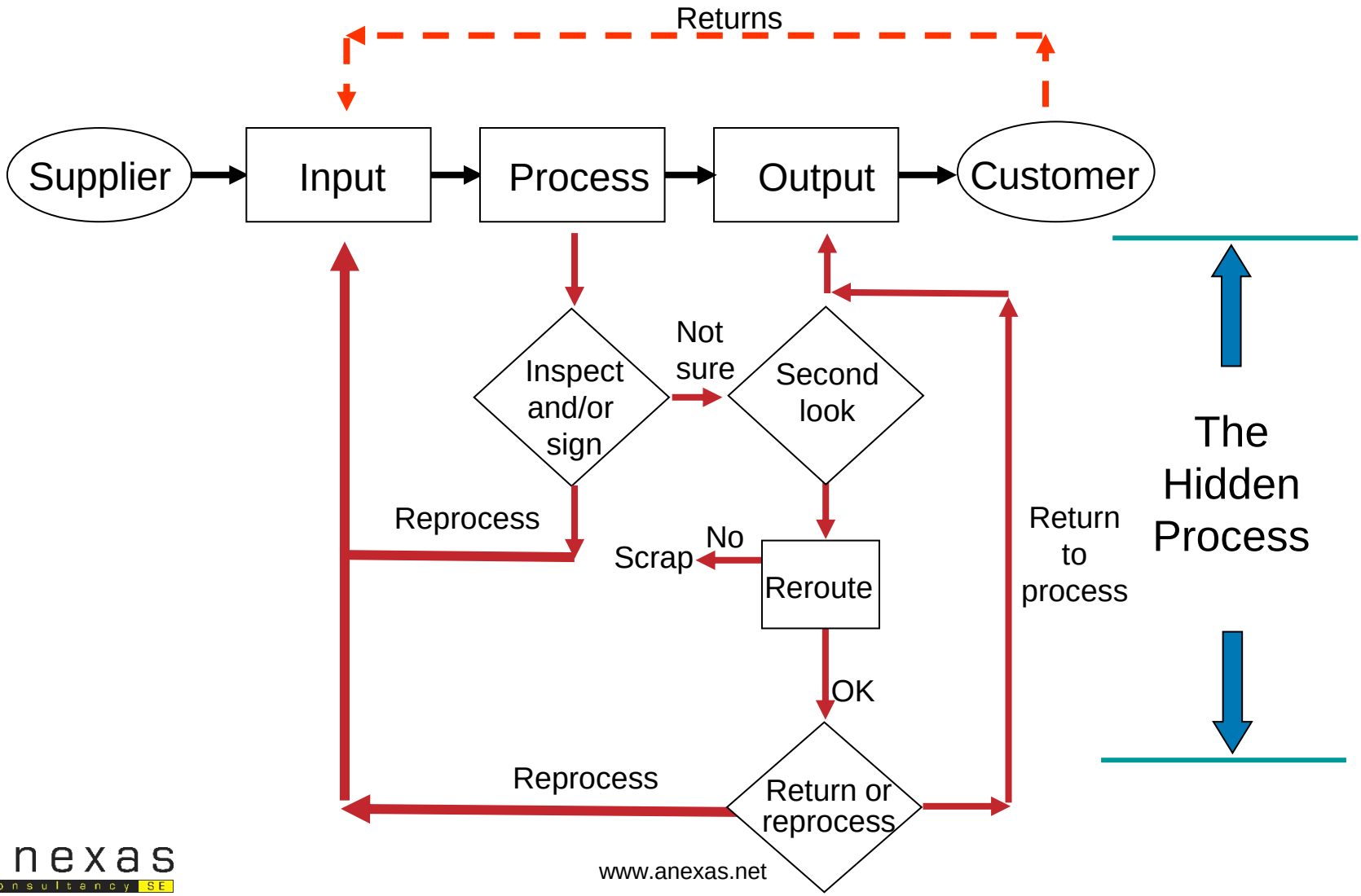
- Customers are willing to pay for it
- It physically alters the product or service
- It is done right the first time

- It needs to be done
- Is necessary to advance the process
- Customers do not want to pay for it
- Customers would say, so what?

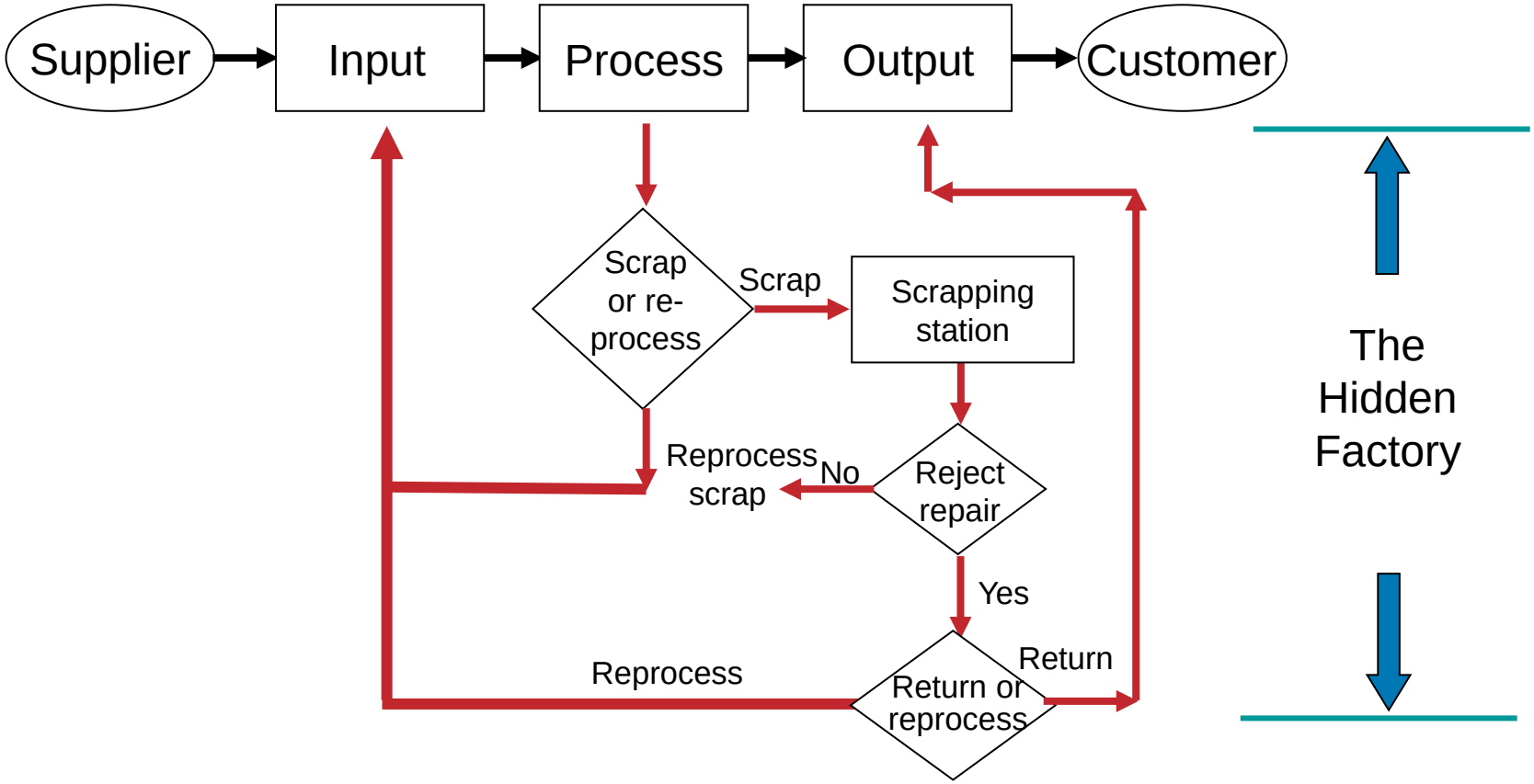
The Cost of Correction: Get It Right the First Time!



The Hidden Process



The Hidden Factory



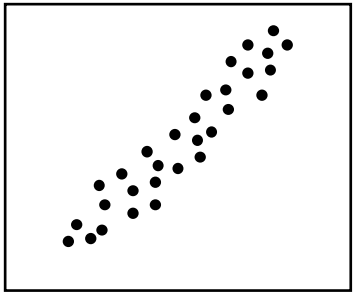
Summary of Wastes - DOWNTIME

Value Analysis Matrix

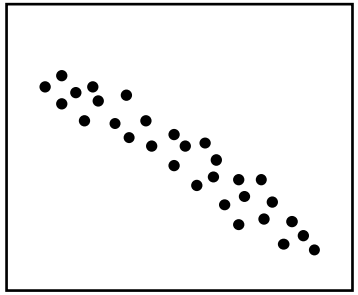
- You can track specific types of non-value-added time with a value analysis matrix
- This helps clarify not only the types of waste present in the process, but also the percentage of the overall process that each non-value-added step adds

Process step	1	2	3	4	5	6	7	8	9	10	Total	%Total
Time (hours)	12	10	1	10	20	6	10	1	10	20	100	100%
Value-added			✔					✔			2	2%
Non-value-added												
Fixing errors									✔		10	10%
Prep/set-up												
Control/inspection						✔					6	6%
Delay	✔				✔					✔	52	52%
Transporting/motion		✔		✔			✔				30	30%
Total											100	100%

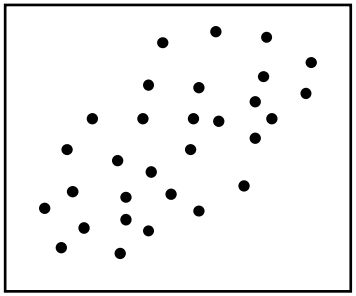
Scatter Plot Patterns



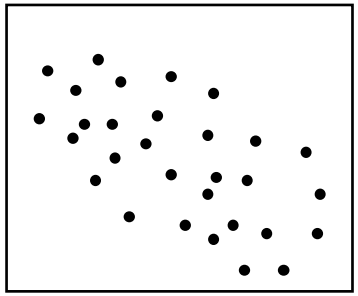
Strong Positive Correlation



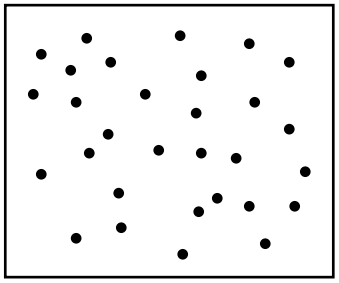
Strong Negative Correlation



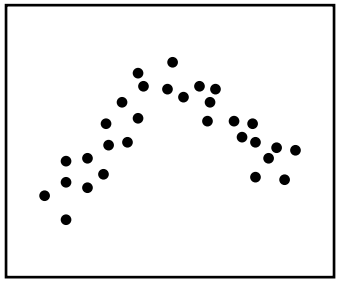
Possible Positive Correlation



Possible Negative Correlation



No Correlation



Other Pattern

Refer to the Minitab training material page number 48 to 50

ANALYZE Phase Deliverables

- Cause-and-effect analysis to identify potential causes (inputs or X's)
- Validated Root causes using Graphical analysis
- Validated Root causes using Hypothesis Tests
- Wastes identified in the system

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Chapter 8:
Generating and Selecting Solutions

Involving People in Developing Solutions

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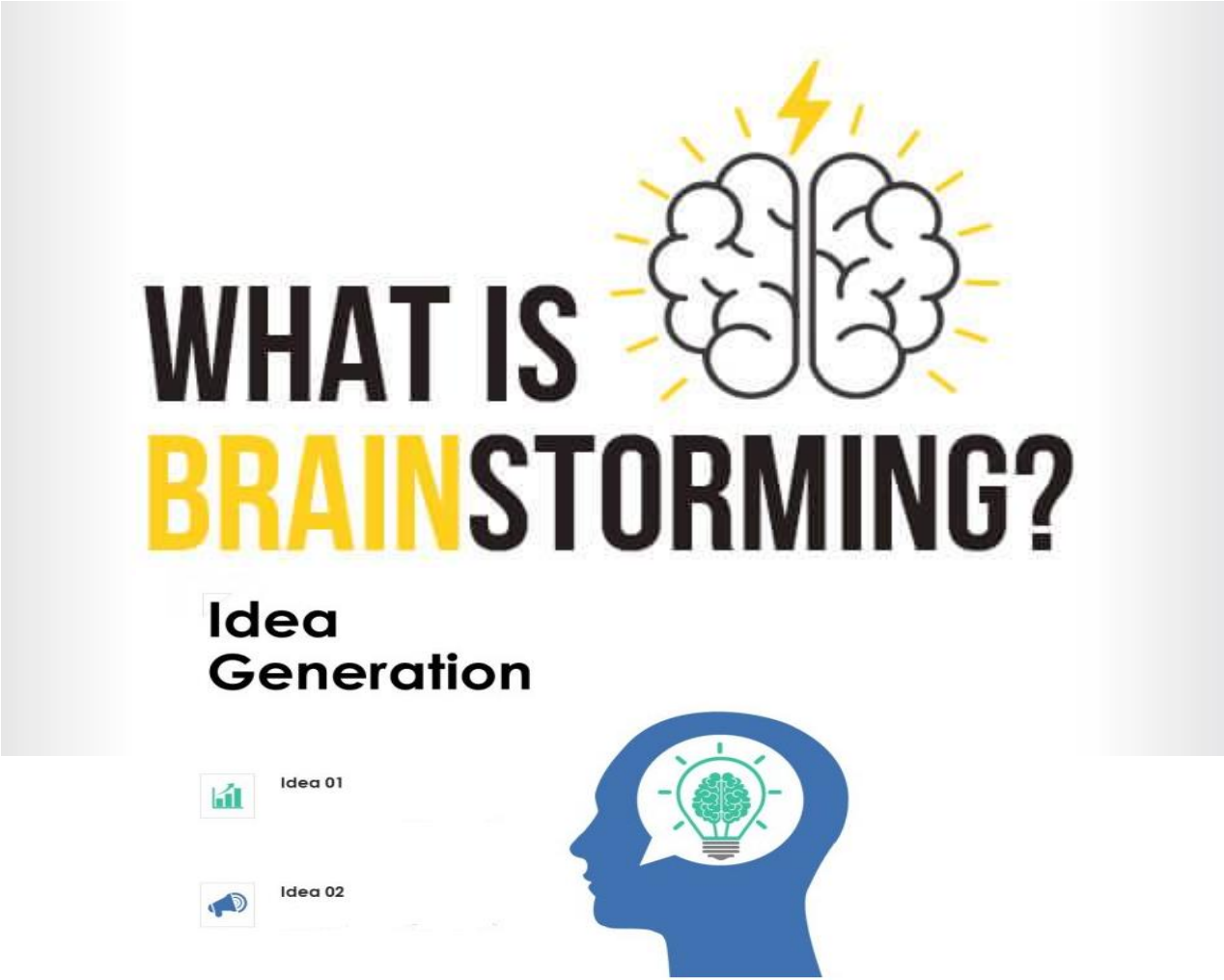
Generating Solution Alternatives

Brainstorming



Pre-requisites of Brainstorming

- Purpose of Brainstorming
- Participants (From the process / not from the process)
- Facilitator
- Stationery
- Selection of tool of brainstorming
- Meeting room
- Facilities
- Communication to participants about time, venue, topic in advance

Rules of Brainstorming

- Equal opportunity to everyone to participate
- Capture all the ideas (Document)
- Leave your designation and ego along with your shoes outside meeting room
- Non threatening environment to be created
- Ensure that there are no disturbances
- Focus on the topic (Create parking lot)
- Fantasize freely (Do not put breaks on your thoughts)
- Watch your time!
- Defer evaluation (Do not discuss ideas)
- Generate Quantity, do not worry about Quality

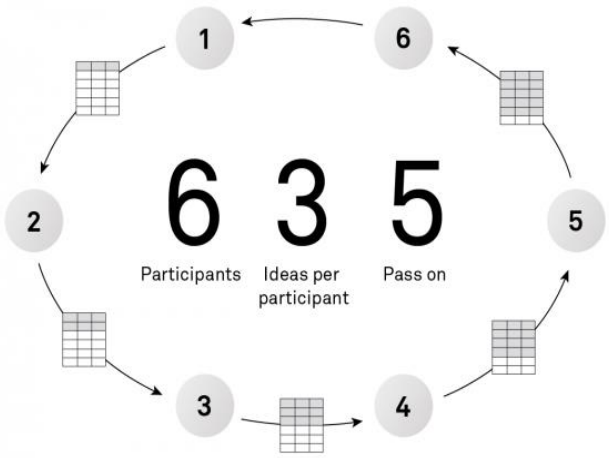
Generating Solution Ideas

- Review what you know about the process and the verified cause
- Brainstorm solution ideas; use creativity techniques
- Combine ideas into solutions

Brainwriting 6-3-5

Brainwriting 6-3-5

- Team members brainstorm ideas on a written form:
  - Take 5 minutes to write down three solution ideas on the first row of your form
  - Pass your form to the right
  - On the form you have just received from your team member, add another three ideas on the next row
  - Add ideas by:
    - Enhancing an idea already on the sheet
    - Adding a variation of an idea on the sheet
    - Adding a completely new idea
  - Repeat for as many rounds as you have team members



Round Robin and Anti Solution

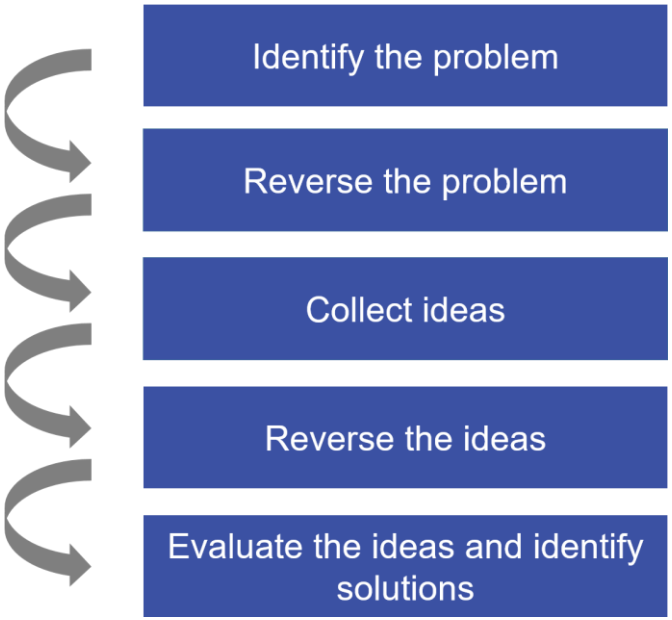
Round Robin

- Everyone gets a chance to put forth his/her idea If they do not have to contribute an idea, they just say pass.
- This goes on till all the participants have exhausted their ideas.

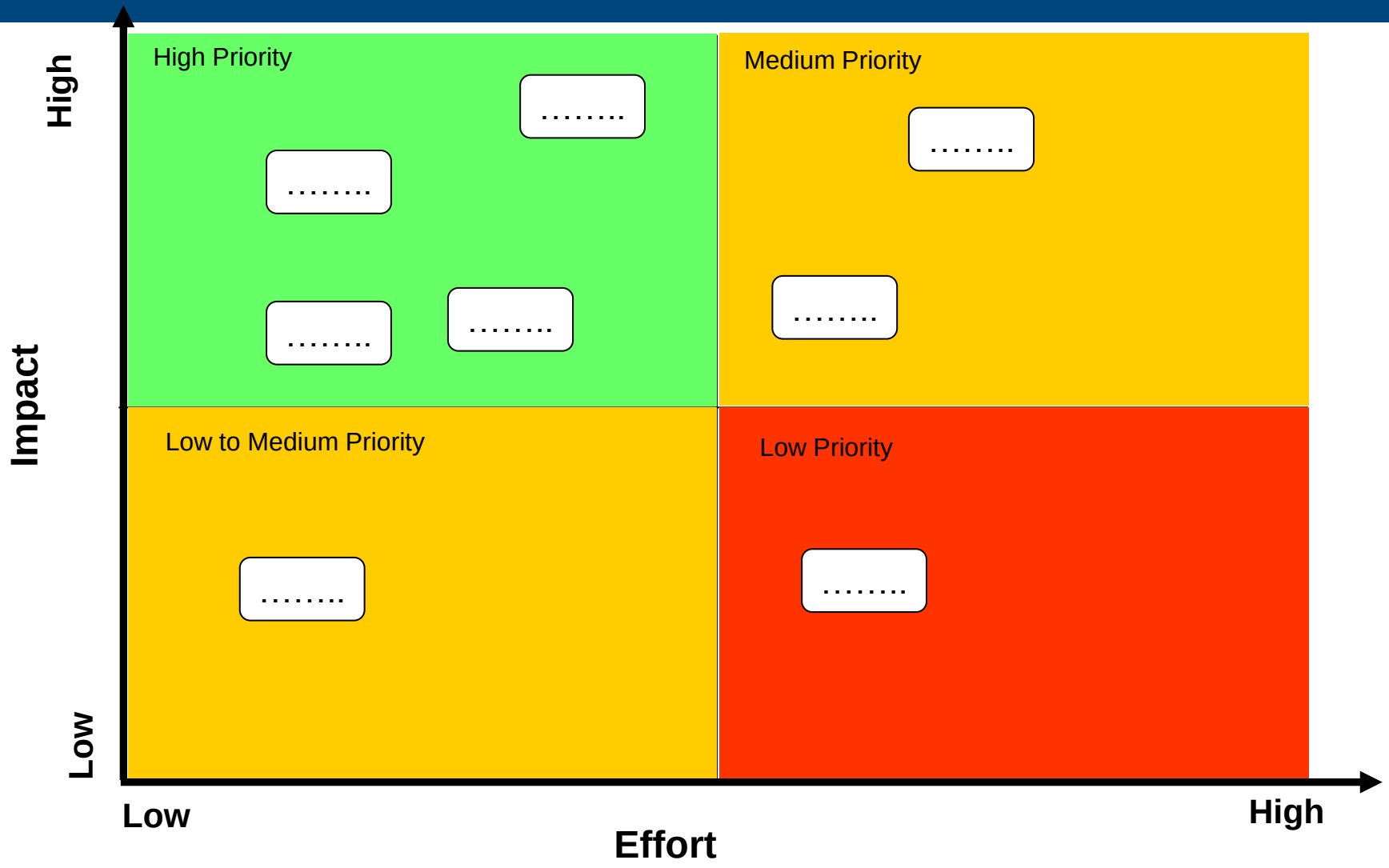
Round Robin and Anti Solution

Anti Solution

- Team brainstorms on how to increase the problem rather than solving it.
- The brainstormed ideas are reversed to get the solution.



Prioritization Tool — Solutions



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Evaluating Solution Alternatives

Solution Selection Matrix

Select among Possible Solutions Using Objective Criteria

Criteria		Weight	House A		House B	
			Score	Weighted Score	Score	Weighted Score
1	Price	9	3	27	9	81
2	Size	3	3	9	9	27
3	Location	9	9	81	3	27
4	Type (Serviced/ Independent)	3	3	9	9	27
5	Floor	1	9	9	9	9
6	Sports facilities	3	9	27	1	3
TOTAL				162		174

Where **weight** and **scores** on following scale : High = 9, Medium = 3 and Low = 1.

Solution Selection Matrix

Criteria		Weight	Solution A		Solution B		Solution C	
			Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
1	cheap solution	3	3	9	9	27	9	27
2	quick to implement	3	9	27	1	3	3	9
3	high impact on CTQs	9	9	81	9	81	9	81
4	compliant	9	1	9	9	81	9	81
5	change management	3	1	3	3	9	9	27
6	resource required	1	9	9	3	3	3	3
TOTAL				138		204		228

Where **weight** and **scores** on following scale : High = 9, Medium = 3 and Low = 1.

Example :

Solution A = outsource all data processing

Solution B = development of our own software

Solution C = buy a software and adapt to our needs

It seems here that solution C is the most satisfying. B also can be considered as an option.

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Chapter 9:
FMEA

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Failure Modes and Effects Analysis

Video is available on
https://youtu.be/EaD1qgsRNr0?si=KP2eHkbXKy0t6ObH

Reducing or Eliminating Risk

- By anticipating potential problems, you can often take countermeasures to reduce or eliminate the risks
- A common tool for this analysis is failure mode and effects analysis (FMEA)

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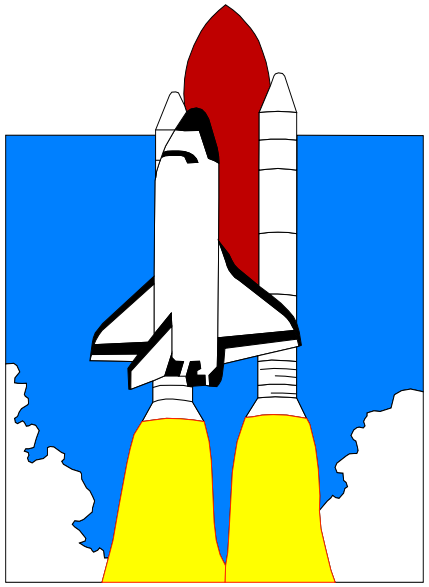
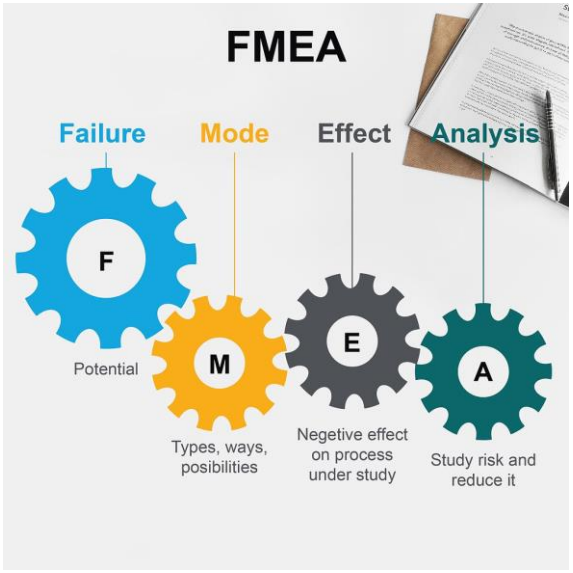


Failure Modes and Effects Analysis

FMEA

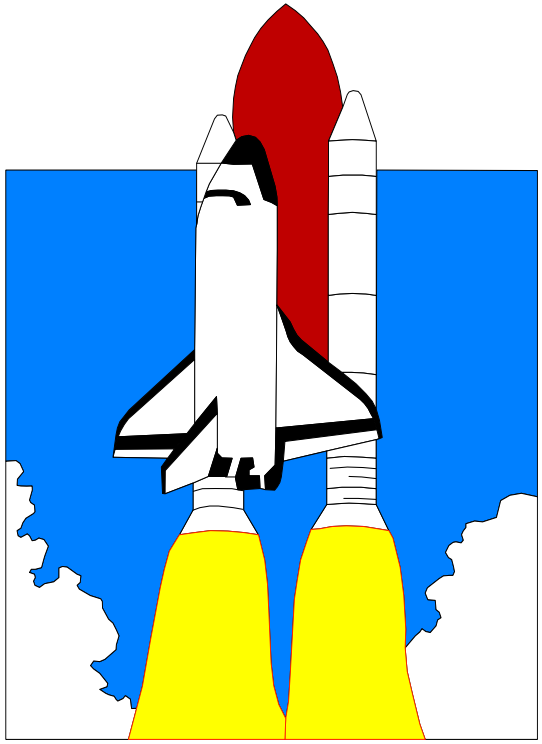
- Typically used in three situations:
  - Product or service design
  - Process execution
  - Analysis of potential human errors
- For the purpose of:
  - Identifying specific ways in which a product, process, or service may fail



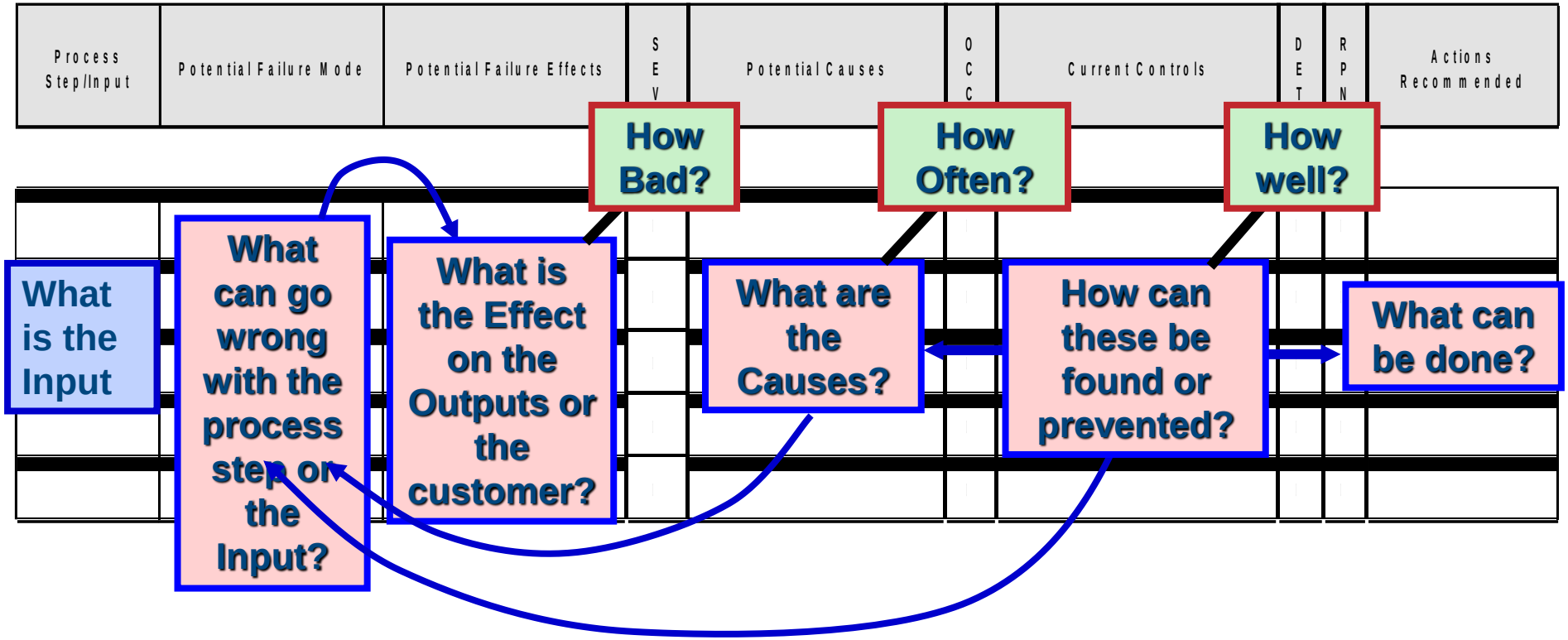
  - Developing countermeasures targeted at those specific failures that will improve performance, quality, reliability, and safety

Types of FMEA

- DFMEA
  - Product, solution or service design
- PFMEA
  - Process improvement
- HFMEA
  - Used in healthcare
- Levels
  - Process
  - Process steps
  - Inputs



Overview


Process Step/Input
Potential Failure Mode
Potential Failure Effects
SEV
Potential Causes
OCC
Current Controls
DET
RPN
Actions Recommended
How Bad?
How Often?
How well?
What is the Input
What can go wrong with the process step or the Input?
What is the Effect on the Outputs or the customer?
What are the Causes?
How can these be found or prevented?
What can be done?

Capturing FMEA Information

FMEA Analysis

Project: ______________________ Team : ______________________

Date ____________ (original)
____________ (revised)

Item or Process Step	Potential Failure Mode	Potential Effect (s) of Failure	Severity	Potential Cause(s)	Occurrence	Current Controls	Detection	RPN	Recommended Action	Responsibility and Target Date	"After" → Action Taken	Severity	Occurrence	Detection	RPN
Total Risk Priority Number =									"After" Risk Priority Number =						

Partial Example FMEA

FMEA Analysis

Project: Tube Filling_____ Team : Tube Team_____ Date 9/10_____ (original) 10/15_____ (revised)

Item or Process Step	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Potential Cause(s)	Occurrence	Current Controls	Detection	RPN	Recommended Action	Responsibility and Target Date	"After" → Action Taken	Severity	Occurrence	Detection	RPN
Tube accumulation	Fall over	Stops feed	4	Machine vibration	10	Machine stops	2	80							
		Knocks over other vials	5	Machine vibration	10	Machine stops	2	100							
	Backup	Cleaning tunnel stops	4	Feed rates misaligned	7	Machine stops	2	56							
Tube closing	No lid	Open tube	4	Hopper underfilled	7	Visual inspection	7	96							
	Lid not seated properly	Open tube	4	Lid misshapen	8	Visual inspection	7	224	Install auto-check for lid shape	MKM by 11/15	Auto-check installed	4	8	2	64
	Punctured tube	Visual defect, possible contamination	5	Tube damaged in shipping or filling	9	Units sampled	9	405	Inspect each tube; use SPC; work with supplier to reduce defects	MER by 11/15	100% inspection Supplier using new tube coating	5	5	5	125

Conducting an FMEA

- Brainstorm potential failure modes—ways in which the product, service, or process might fail. Write down the effect of failure mode and give the rating from 1 to 10 for the severity of failure effect.
- Brainstorm on the potential causes and give them the occurrence rating from 1 to 10
- Brainstorm on the current controls and give them a detection rating from 1 to 10
- Determine risk of each failure mode (RPN = risk priority number):
  - Severity × Occurrence × Detection
- Identify ways to reduce or eliminate risk associated with high RPNs

Determining RPNs

- Identify potential effect of each failure (consequences of that failure) and rate its severity:
  - Examples: defective product, wrong information, or delays
- Identify causes of the effects and rate their likelihood of occurrence
- Rate your ability to detect each failure mode
- Multiply the three numbers together

Sample Severity Rating Scale

Severity = likely impact of the failure

	Rating	Criteria: A failure could . . .
Bad	10	Injure a customer or employee
	9	Be illegal
	8	Render the product or service unfit for use
	7	Cause extreme customer dissatisfaction
	6	Result in partial malfunction
	5	Cause a loss of performance likely to result in a complaint
	4	Cause minor performance loss
	3	Cause a minor nuisance; can be overcome with no loss
	2	Be unnoticed; minor effect on performance
Good	1	Be unnoticed and not affect the performance

Sample Occurrence Rating Scale

	Rating	Time Period	Probability	
Bad	10	More than once per day	**>**	30%
	9	Once every 3–4 days	**≤**	30%
	8	Once per week	**≤**	5%
	7	Once per month	**≤**	1%
	6	Once every 3 months	**≤**	.03%
	5	Once every 6 months	**≤**	1 per 10,000
	4	Once per year	**≤**	6 per 100,000
	3	Once every 1–3 years	**≤**	6 per million
	2	Once every 3–6 years	**≤**	3 per 10 million
Good	1	Once every 6–100 years	**≤**	2 per billion

Sample Detection Rating Scale

	Rating	Definition
Bad	10	Defect caused by failure is not detectable
	9	Occasional units are checked for defects
	8	Units are systematically sampled and inspected
	7	All units are manually inspected
	6	Manual inspection with mistake-proofing modifications
	5	Process is monitored (SPC) and manually inspected
	4	SPC used with an immediate reaction to out of control conditions
	3	SPC as above with 100% inspection surrounding out of control conditions
	2	All units are automatically inspected
Good	1	Defect is obvious and can be kept from affecting customer

Exercise: Planning to Minimize Failures

Objective: Practice anticipating potential problems using the FMEA model

Instructions:

- Identify a possible solution for your problem
- Select two steps or areas where failures are possible
- Work through an FMEA for the selected areas
- Be prepared to share your answers with the whole group

Time: 20 minutes

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Piloting

Benefits of Piloting

- Improved solution
- Improved implementation plan
- Increased buy-in
- Get some of the benefits of the improvement quickly
- Reduced risk of failure or unknown complications
- Ability to confirm assumed cause-and-effect relationships
- Increased ability to quantify costs and benefits
- Overall benefit is a better solution with fewer surprises

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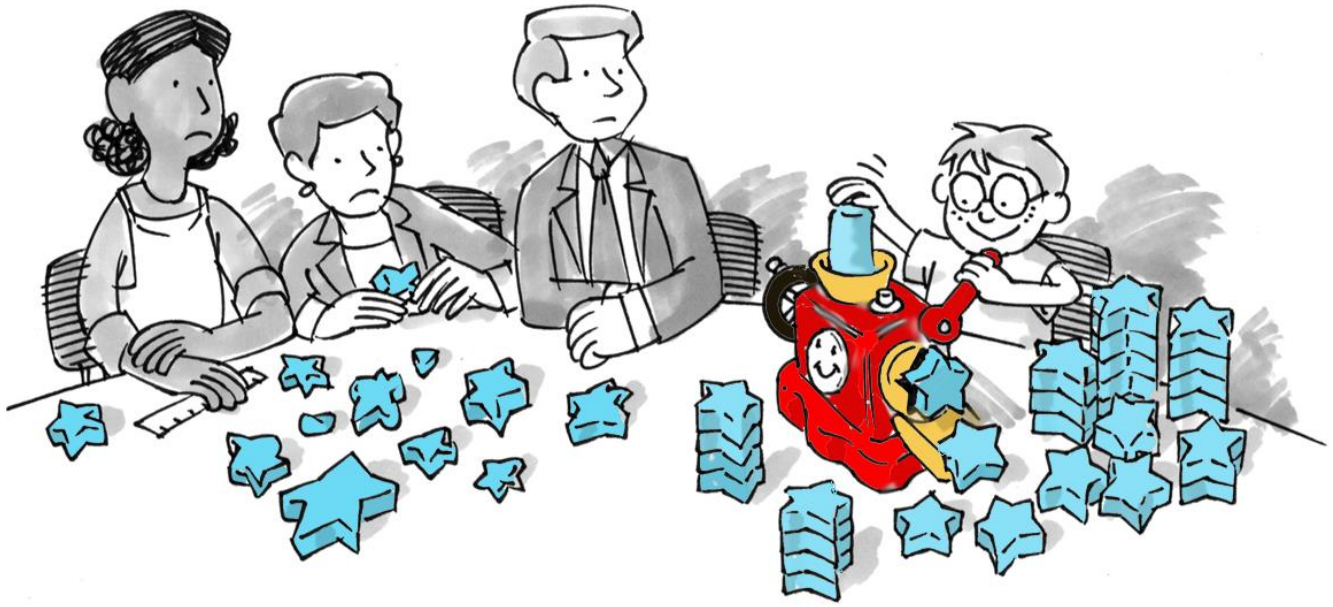
Chapter 10: Standardization and Training

Core Principle

- Nothing happens on a reliable, sustained basis unless we build a system to cause it to happen on a reliable, sustained basis
- Standardization is what allows high quality to happen on a reliable, sustained basis



What Is Standardized Work?

- Standardized work is the most efficient and effective combination of people, material, and equipment that is presently possible:
  - Sets the baseline, which allows:
    - Measurement of performance
    - Identification of improvements
    - Assessment of changes

Standardization

- Making sure that important elements of a process are performed consistently in the best known way
- Changes are made only when data shows that a new alternative is better
- Documentation is key:
  - Making sure documentation is up to date encourages ongoing use of standardized methods
- Discussion:
  - What images come to mind when you think of process standardization?

Benefits of Standardization

- Standardization helps us compete more successfully in the marketplace by providing:
  - Increased reliability
  - Reduced costs
  - Improved employee performance
  - Increased safety
  - Processes that remain in control
  - Continuous improvement
  - A framework that can be quickly changed and communicated to all employees, allowing for rapid response to changing customer needs

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Developing Standard Practices and Procedures

Standardization = “Standard Practices and Procedures”

- A standard practice is:
  - “A definition of a work method wherein all variables of the method have been specified in detail” *
  - It is a written agreement between the employee and the company regarding how the job will be done

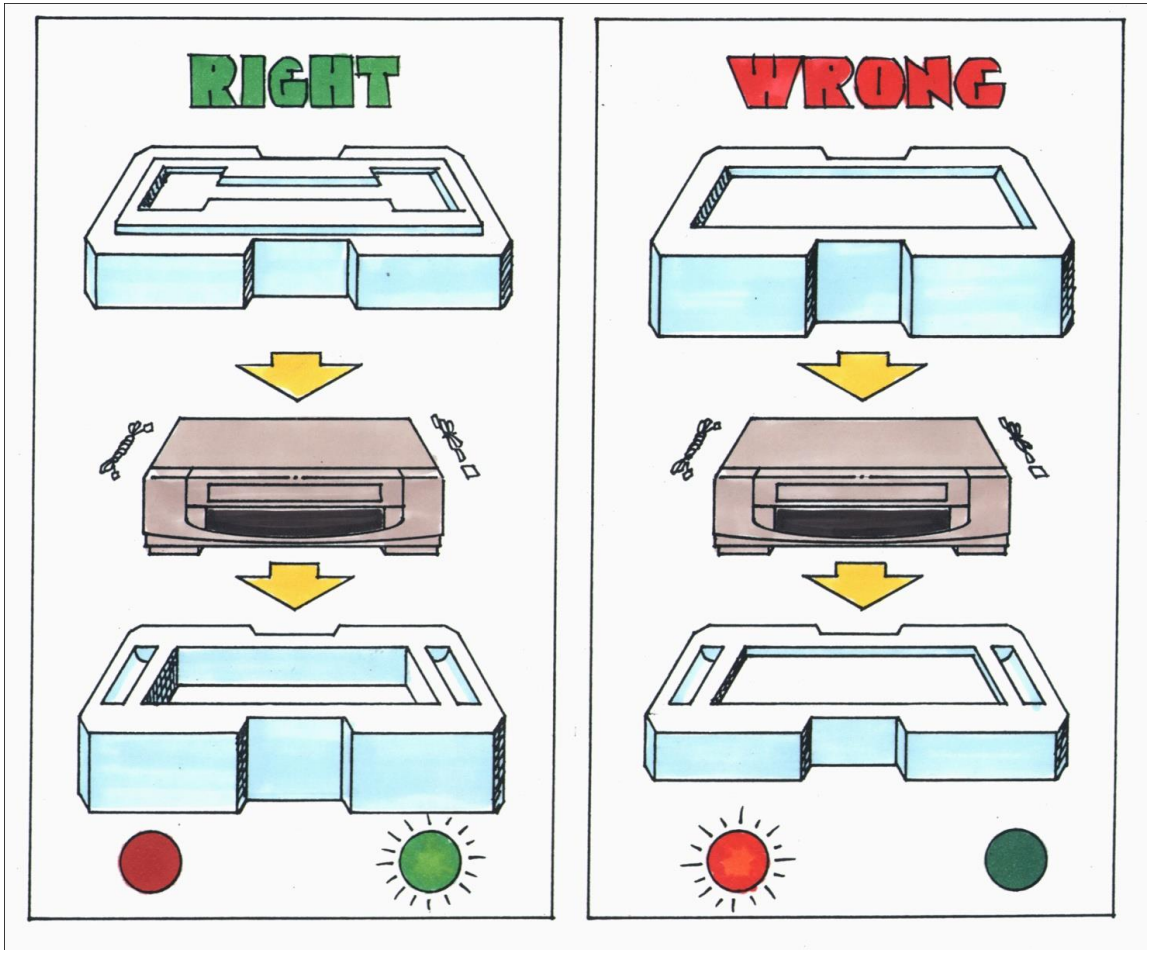
Examples of Standards

- Visual standards
- Process maps
- Standardized work procedures or SOPs (Standard Operating Procedures) —operational standards

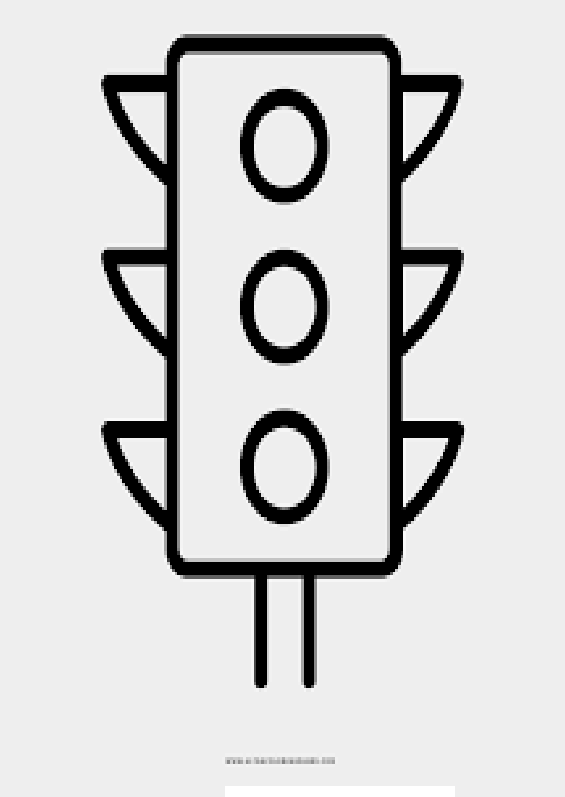
Visual Standards

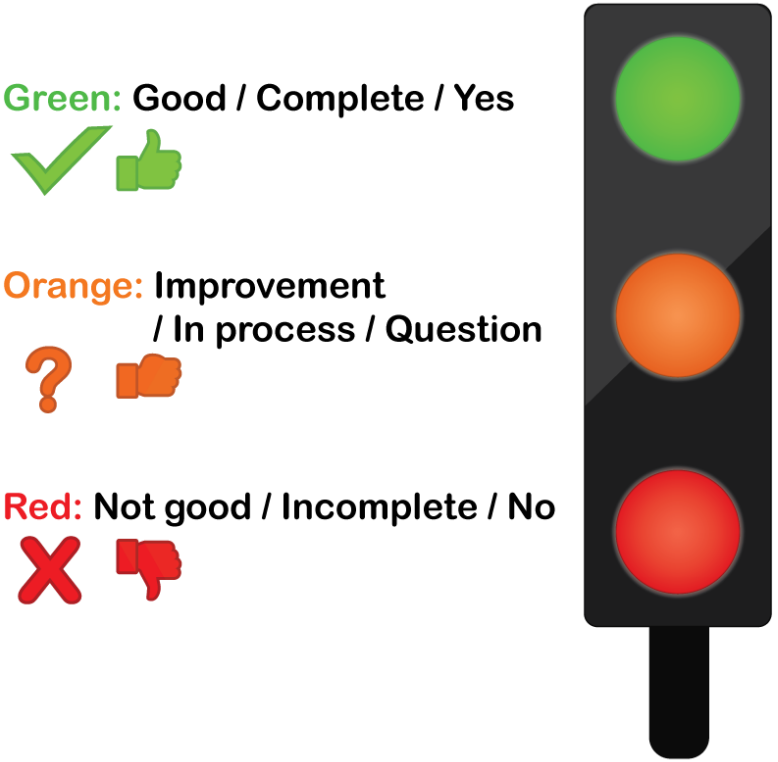
- Standards provide a visual representation of the correct way to do something
- Visual standards at the worksite include:
  - Standardized work documentation
  - Worksite arrangement documentation
  - Abnormality tagging

Visual Standards: Standardized Work Documentation—Packaging Example



Visual Standards: Standardized Work Documentation—What Is Acceptable?

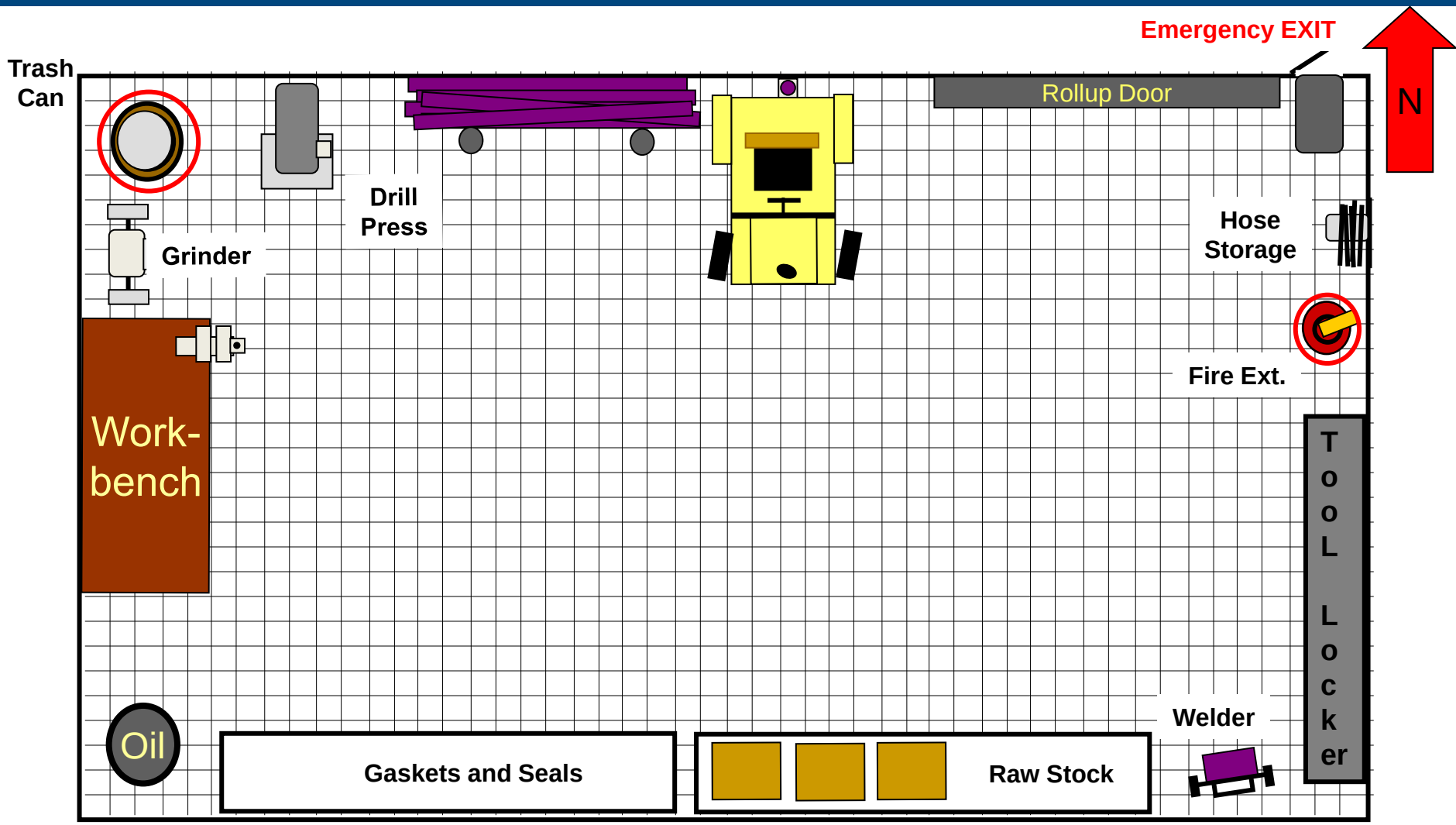




Visual Standards: Worksite Arrangement Documentation

- Layout of the workplace and the worksite

Visual Standards: Worksite Arrangement Documentation, cont.



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Training

Training

- When you have completed the documentation, you need to make sure that everyone using the process is trained in the new methods
- Even experienced employees need to be trained in the new methods

Planning for Training

- Do not try to develop a single training session to teach people everything they may ever need to know about the job:
  - Focus on the most critical aspects of the job
  - When you make changes to a process, explain the reasons behind the changes; people resist change for change's sake
  - Combine up-front training with performance support
  - Do not expect everyone to learn everything at once; provide job aids
  - Remember that most learning will occur on the job

Documentation and Training: Review

- Standardization allows us to maintain the gains
- Documentation of the standard practice is the foundation for implementation and monitoring
- Training ensures that all process users perform key tasks in the same way

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Chapter11:
Change Management

Change Management

Q Quality

x

A Acceptance

=

E Effectiveness

Change Management - Overview

D + V + F > R

Dissatisfaction

+

Vision

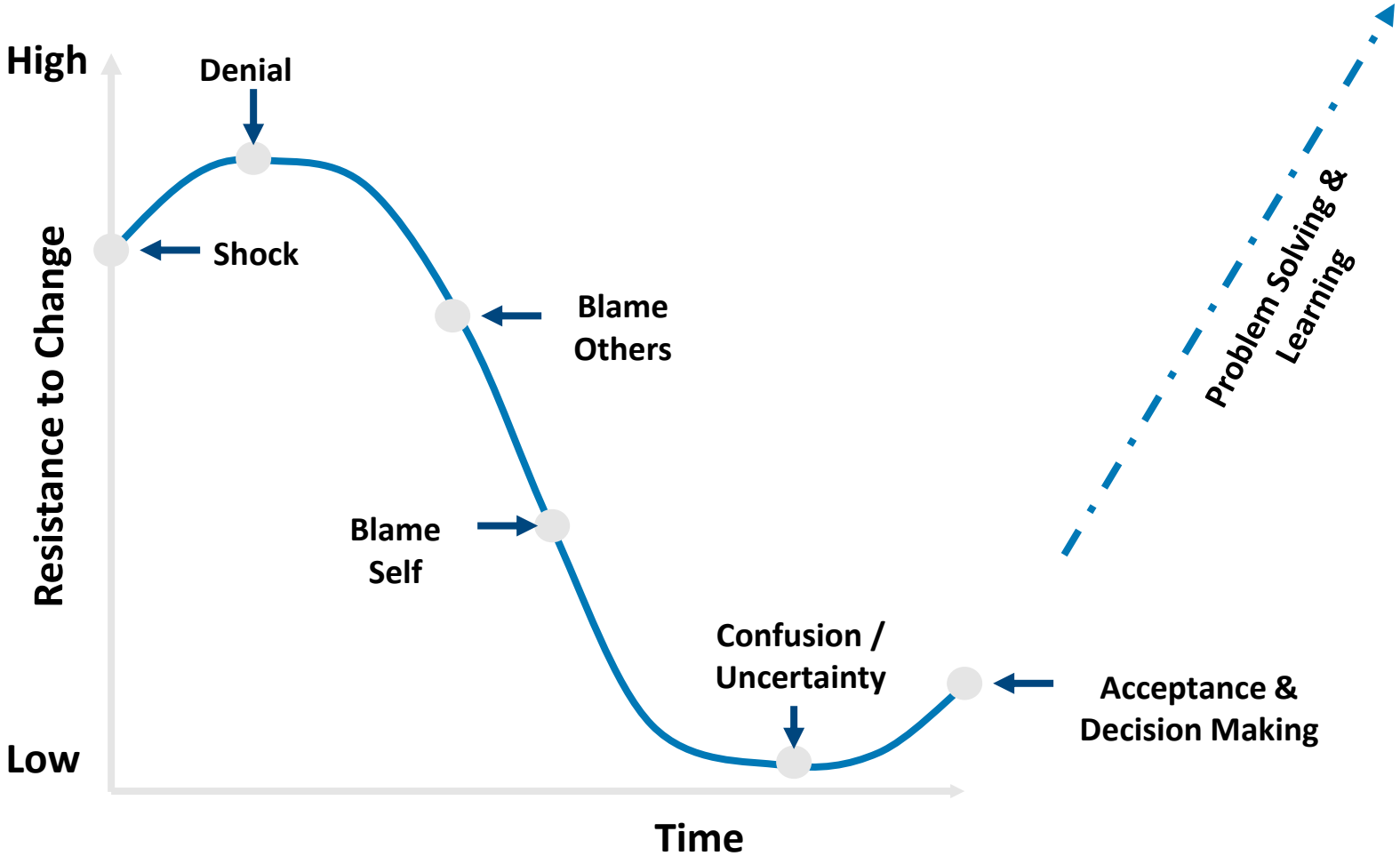
+

First Step

>

Resistance

Change Management – Change Curve



Stakeholders Analysis

Analyzing Stakeholders Position

Names	Strongly Against	Moderately Against	Neutral	Moderately Supportive	Strongly Supportive

Steps:

1. Plot where individuals currently are with regard to desired change (✓ = current)
2. Plot where individuals need to be (X = desired) in order to successfully accomplish desired change – identify gaps between current and desired positions
3. Indicate how individuals are linked to each other, draw lines to indicate an influence link using an arrow (→) to indicate who influences whom
4. Plan action steps for closing gaps

Stakeholders Analysis

Analyzing Sources of Resistance

TPC matrix

Source of Resistance	Definition of causes of resistance	Examples from this change
Technical	▪ Habit and inertia ▪ Difficulty in learning new skills ▪ Lack of skills	
Political	▪ Threats to old guard from new guard ▪ Relationships and networks ▪ Loss of power or authority ▪ Self-preservation	
Cultural	▪ Selective perception ▪ Old "mindset" ▪ Strong values hampering change	

Change Management Actions

Collecting Elements of Proof

3 Ds matrix

Variety Of Approaches...	Elements of proof
Produce Data: ▪ Internal sources ▪ External networks	
Show Demonstration: ▪ Finding examples ▪ Best practices ▪ Visiting other organizations	
Generate Demand: ▪ Leadership modeling ▪ High standards ▪ “Walk the talk”	

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Chapter 12:
Closure

Importance of Closure

- Recognize the considerable time and effort that went into the initiative
- Capture the learnings from the initiative:
  - About the problem or process being studied
  - About the improvement process itself
- Hand over responsibilities for standardization and monitoring to the appropriate people

Project Closure

- Improvement must be continuous, but individual initiatives and project teams come to an end
- Learn when it is time to say good-bye
- Effective project closure weaves together the themes of:
  - Project purpose
  - Improvement methods
  - Team skills and structures
- Develop managerial systems to capture learnings and enable the organization to address system issues
- Documentation and recognition are two critical aspects of project team closure

Stay Connected!

- Please subscribe Anexas Europe YouTube channel to get access to all the training material on video. https://m.youtube.com/channel/UCAk6lJsnPCsz7-rZTVx90uw
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Thank You!

- Please write to Anexas Team at enquiry@anexas.net for any queries
- Anexas website: www.anexas.net

Thank You!

- Congratulations on completing a milestone in your life!
- Best wishes for your Process Excellence journey!

- Amitabh Saxena

Master Black Belt