EFFECTIVE PROBLEM SOLVING & DECISION MAKING

การแก้ปัญหาและตัดสินใจอย่างมีประสิทธิภาพ

(เอกสารประกอบการอบรมฯ)

พลอยไพลิน สกลอรรจน์ / Regional Six Sigma Black Belt

Group Activity

ความคาดหวังในวันนี้

ความยาก/ความท้าท้ายเมื่อเกิด **Incident** มีอะไรบ้าง

ตั้งชื่อกลุ่ม

เลือกหัวหน้ากลุ่ม

10 mins

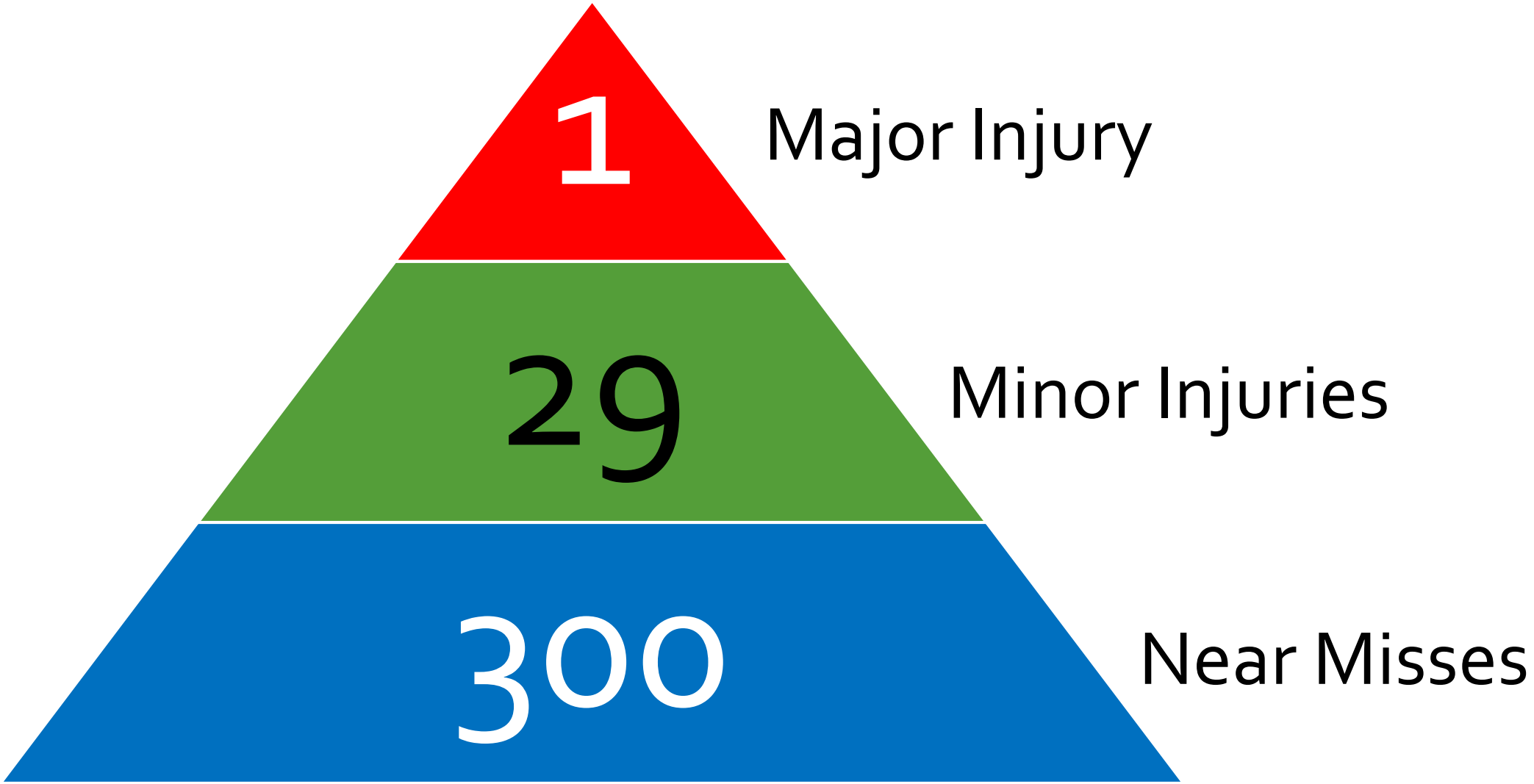
HOW TO HANDLE INCIDENT CASE?

Problem Solving

Contingency Plan

Risk Management

The Heinrich 300-29-1 Model



Structured Problem Solving Process

DESCRIBE

1. Describe the Problem

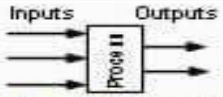
	IS	IS NOT
WHAT		
WHEN		
WHERE		
EXTENT		

Is/Is Not Diagram

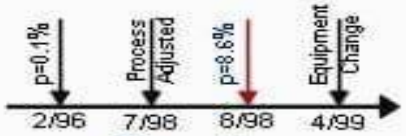
Problem Definition

Final yield of process changed from 59% to 53% during the period from March 1999 to April 1999.

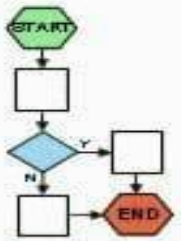
Definition



Input/Output Diagram



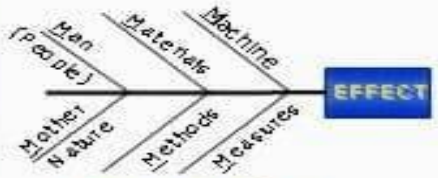
Time Line



Process or Usage Flow

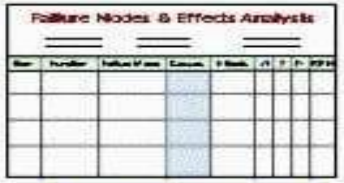
IDENTIFY

2a. Identify Potential Causes:



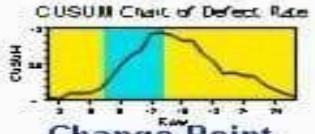
Cause & Effect Diagram (6M)

Distinctions & Changes

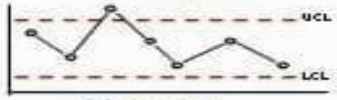


Failure Modes & Effects Analysis

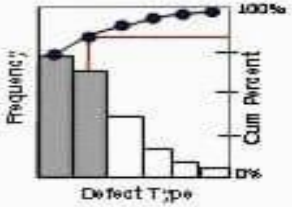
2b. Collect, Organize, an Analyze Existing Data:



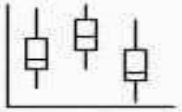
Change Point Analysis



Process Control Chart



Pareto Analysis

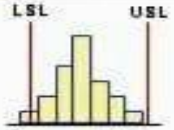


Box Plots

Scatter Diagram

	M	T	W	Th	F
A		X			
B			X	X	X
C		X		X	
D	X	X			

Checksheet



Capability Study

Multi-Vari Chart

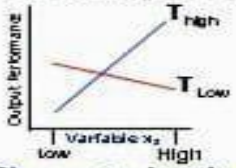
EVALUATE

3. Compare Causes to the Facts

Contradiction Matrix

SOLVE

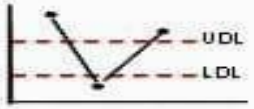
4. Collect Additional Data to Identify Root Cause(s):



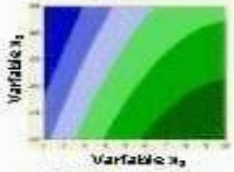
Characterization Experiments

- ANOVA
- Contingency Tables
- Comparison Tests

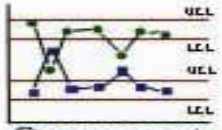
Statistical Comparisons



Analysis of Means



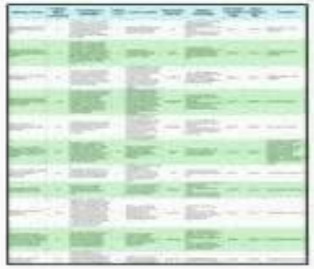
Response Surfaces



Component Swapping Study

5. Determine Corrective Actions:

Corrective Action Plan



- Elimination
- Facilitation
- Mitigation
- Flagging

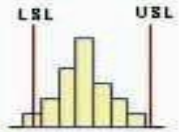
Error Proofing

CONTROL

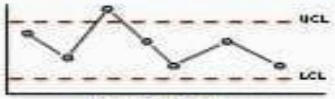
6. Validate, Implement, and Standardize Solution:

TASK	SCHEDULE
1	
2	
3	
4	
5	

Implementation Plan



Capability Study



Process Control Chart

Sampling Plan

Funny Ball Game

What helped you to **improve**?

AGENDA

1. Introduction to Basic Problem Solving
2. Lean vs Six Sigma
3. 4 Steps of Systematic Problem Solving
4. Simulation Round 1
5. Step 1 Define Problem

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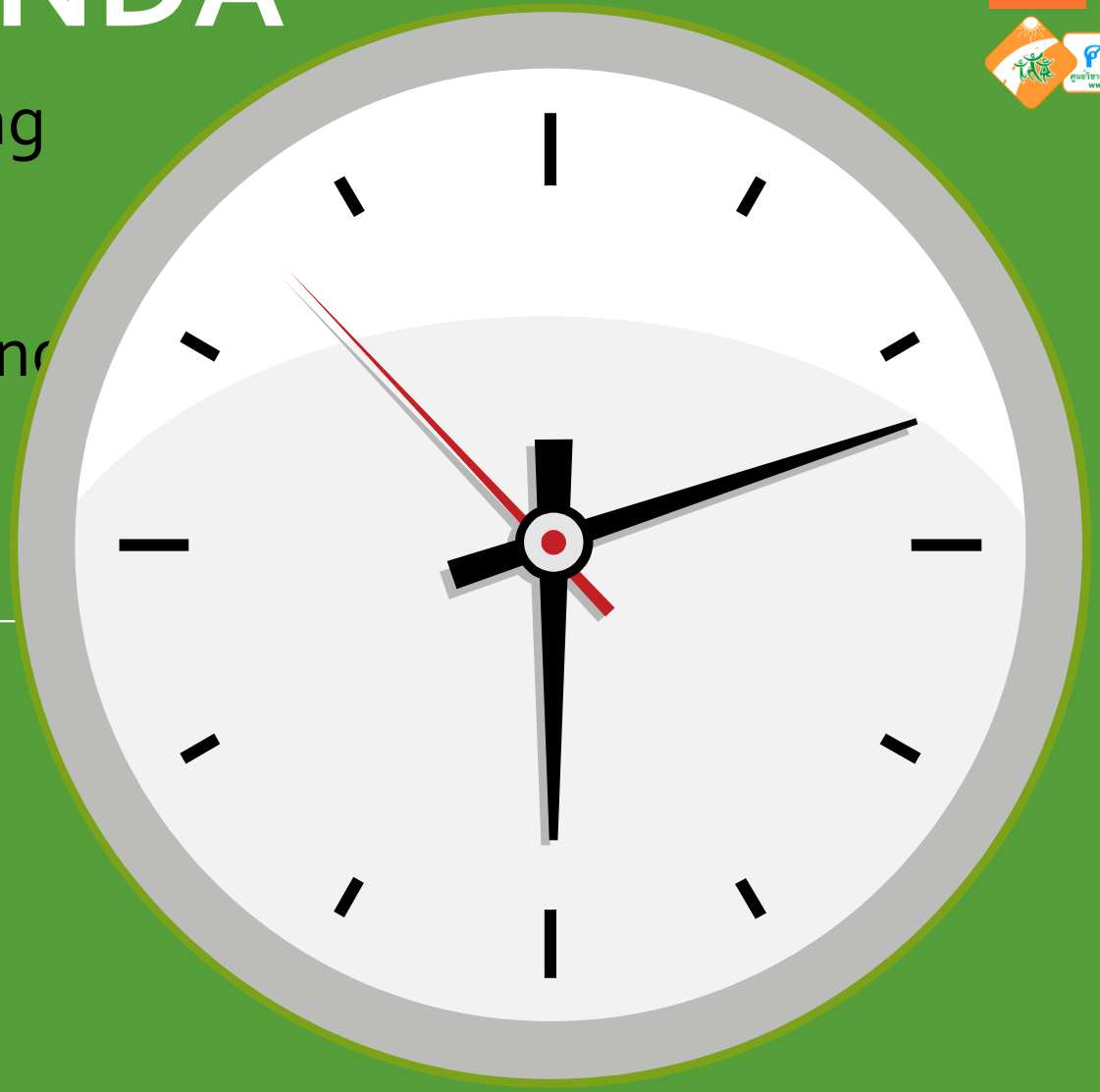
6. Step 2 Understand Cause
7. Step 3 Implement Solution
8. Simulation Round 2
9. Step 4 Sustain Performance
10. Key learning & How to apply



Lean vs Six Sigma

Lean : Flow, Cycle Time, Waste

Six Sigma : Accuracy, Variation, Defects

4 Steps of Systematic Problem Solving

Define Problem → How big of problem?

Understand Causes → Focus on workflow

Implement Solution → Using tools to screen out solution

Sustain Performance → How to sustain?

4 Steps of Systematic Problem Solving

Define Problem

- Describe Problem
- Problem & Goal Statement
- Visualize Graphical

Understand Causes

- Map & Analyze Process
- Identify Causes

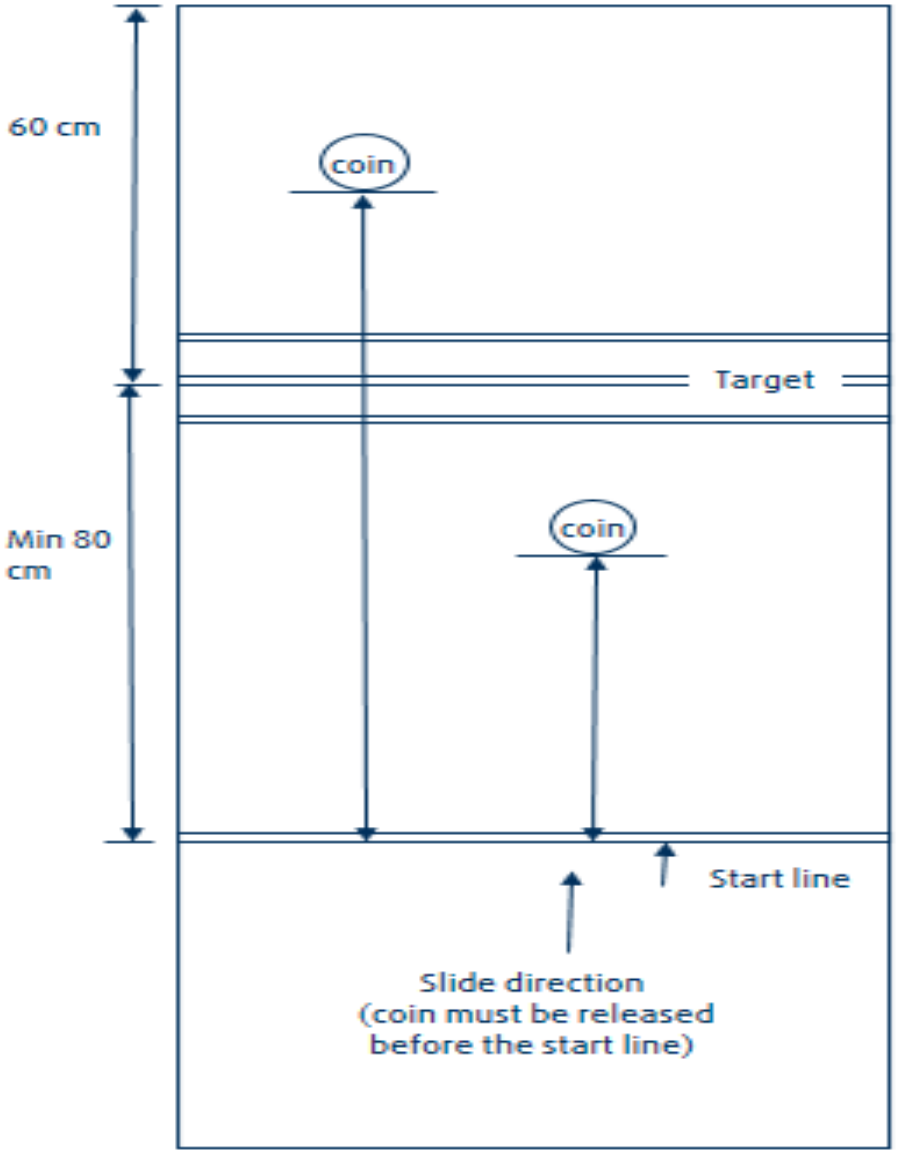
Implement Solution

- Develop Solution
- Roll-out Solution

Sustain Performance

- Sustain Performance
- Visualize Improvements

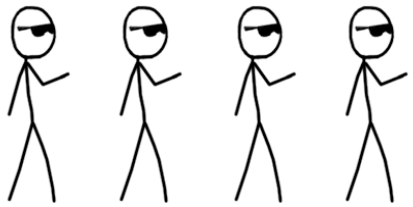
Simulation Round I



สิ่งที่ลูกค้าต้องการ

เหรียญที่อยู่ในสเปค +/- 10 cm ของเส้น Target

กระบวนการผลิตของ Sliding Coin factory



พนักงานฝ่ายผลิต

พนักงานวัดระยะ

พนักงานจดบันทึก

ผู้บริหาร

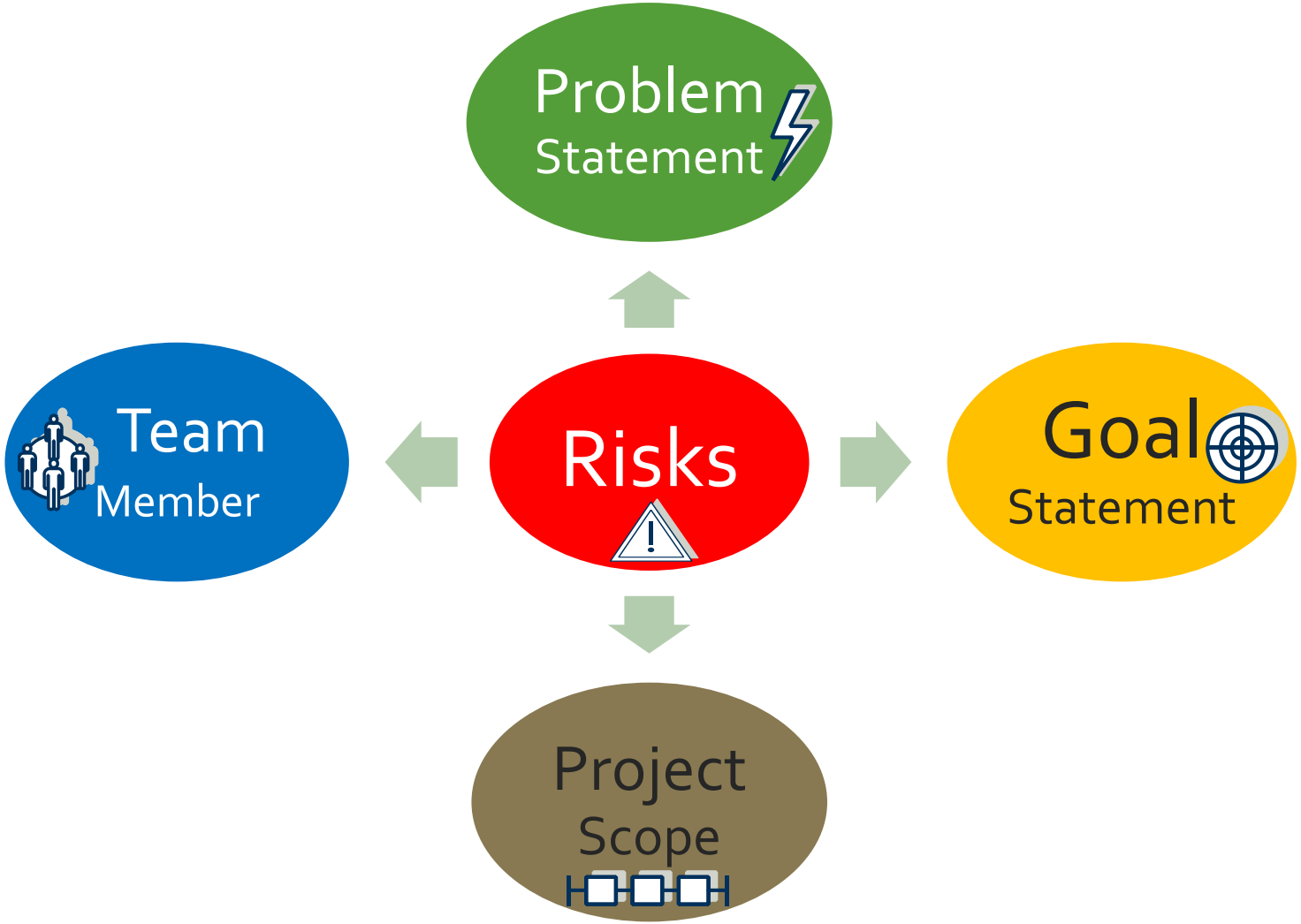
4 Steps of Systematic Problem Solving

Define Problem

How big of problem?

- Describe Problem
- Problem & Goal Statement
- Visualize Graphical

5 Elements to Describe Problem



What is your PROBLEM statement?

Example

Product returns are **5% of sales**, resulting in a **profit impact of 5 MB** and **customer dissatisfaction**.

What is yours?

What is your GOAL statement?

Example

Reduce product returns from 5% to 2.5% of sales by year end.

What is yours?

Group Workshop 1

- Identify Problem Statement and Goal Statement of your factory performance.
- Report Out.

Visualize Graphical = Collect Data + Display Data

Collect Data

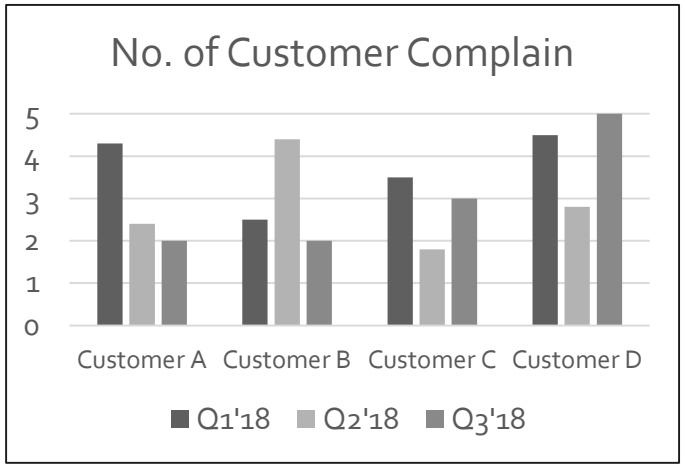
- Check Sheet
- Distribution Check Sheet
- Concentration Diagram
- Load data from System

Display Data

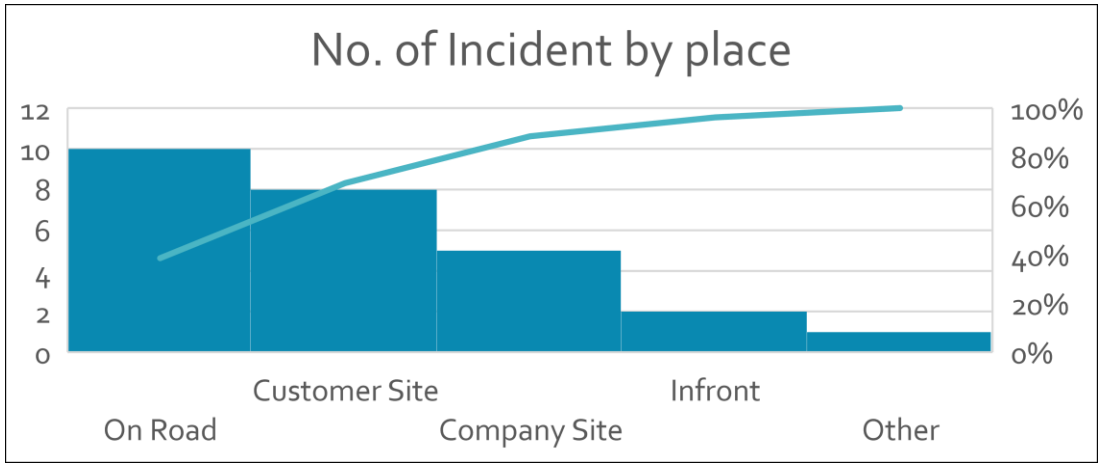
- Bar Chart
- Pareto Chart
- Pie Chart
- Run Chart /Time Series Plot
- Correlation

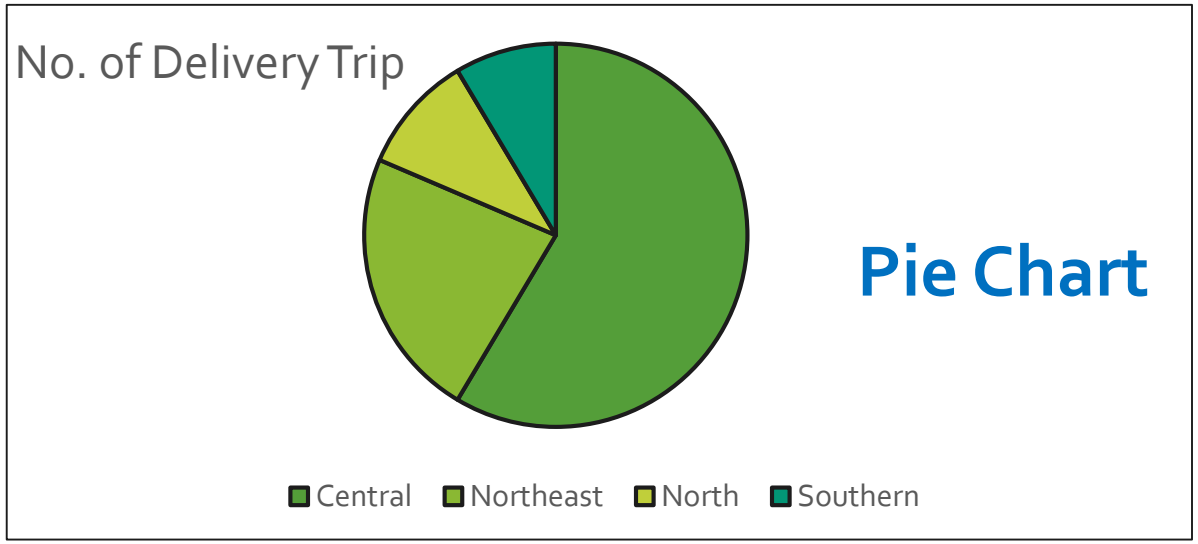
Display Data

Bar Chart



Pareto Chart



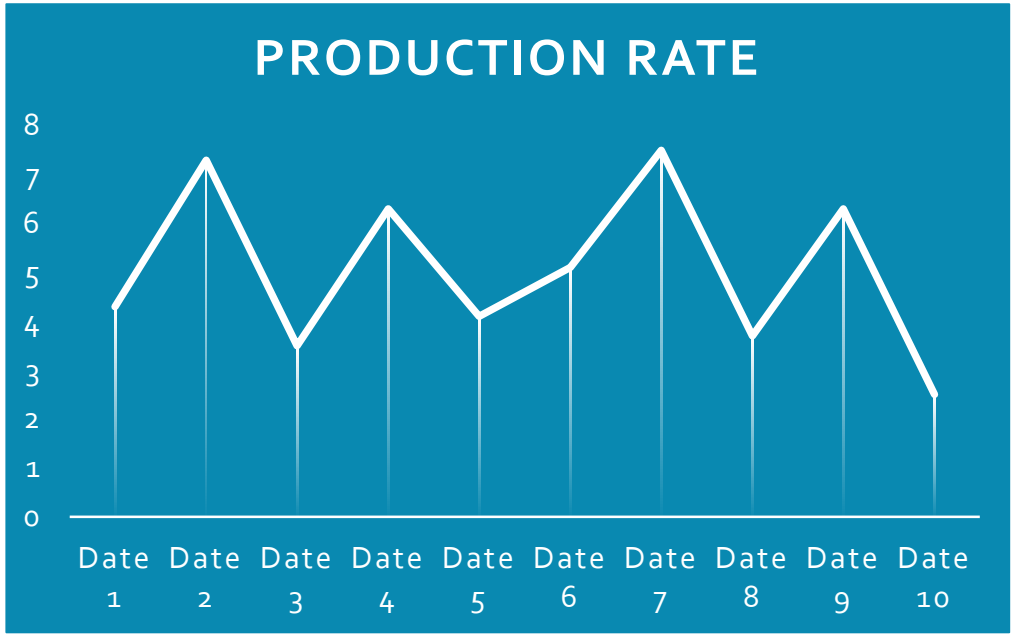


Pie Chart

Comparison

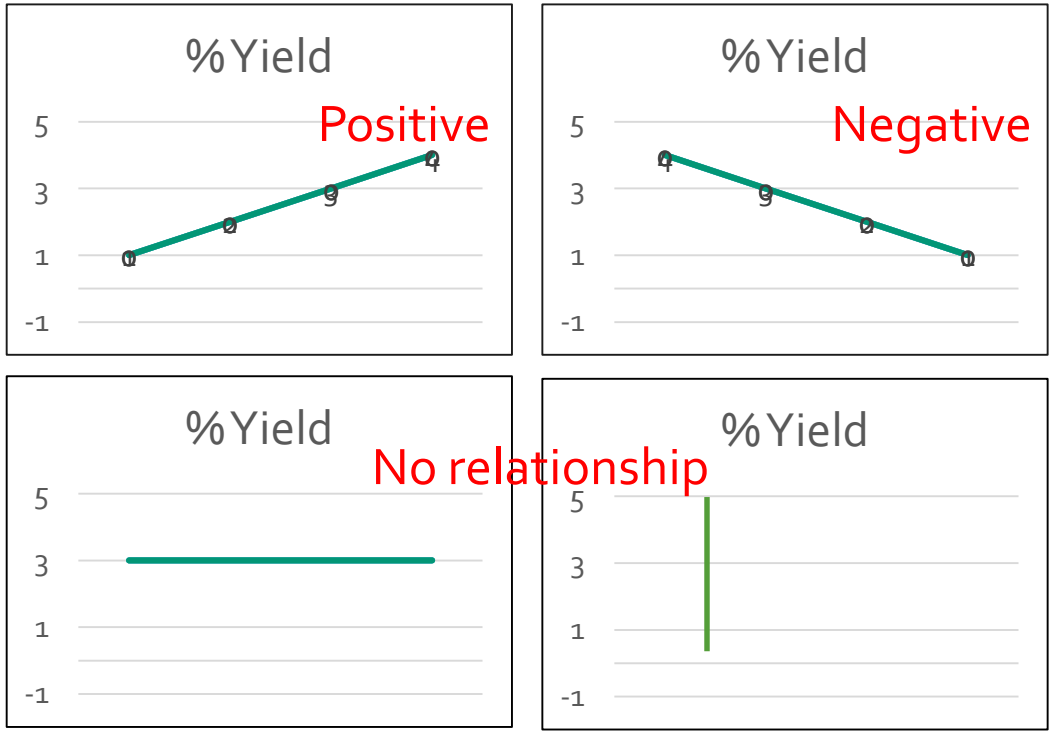
Display Data

Run Chart / Time Series Plot



Trend over Time

Correlation



Relationship

ASK yourself !

What am I trying to communicate with my data / graph ?

(i) Comparison ?

(ii) Trending over time ?

(iii) Relationship ?

Group Workshop 2

- Work in your team
- Visualize your data by using simulation data
- Draw Bar chart, Pareto, Pie chart & Time series plot
- Report Out

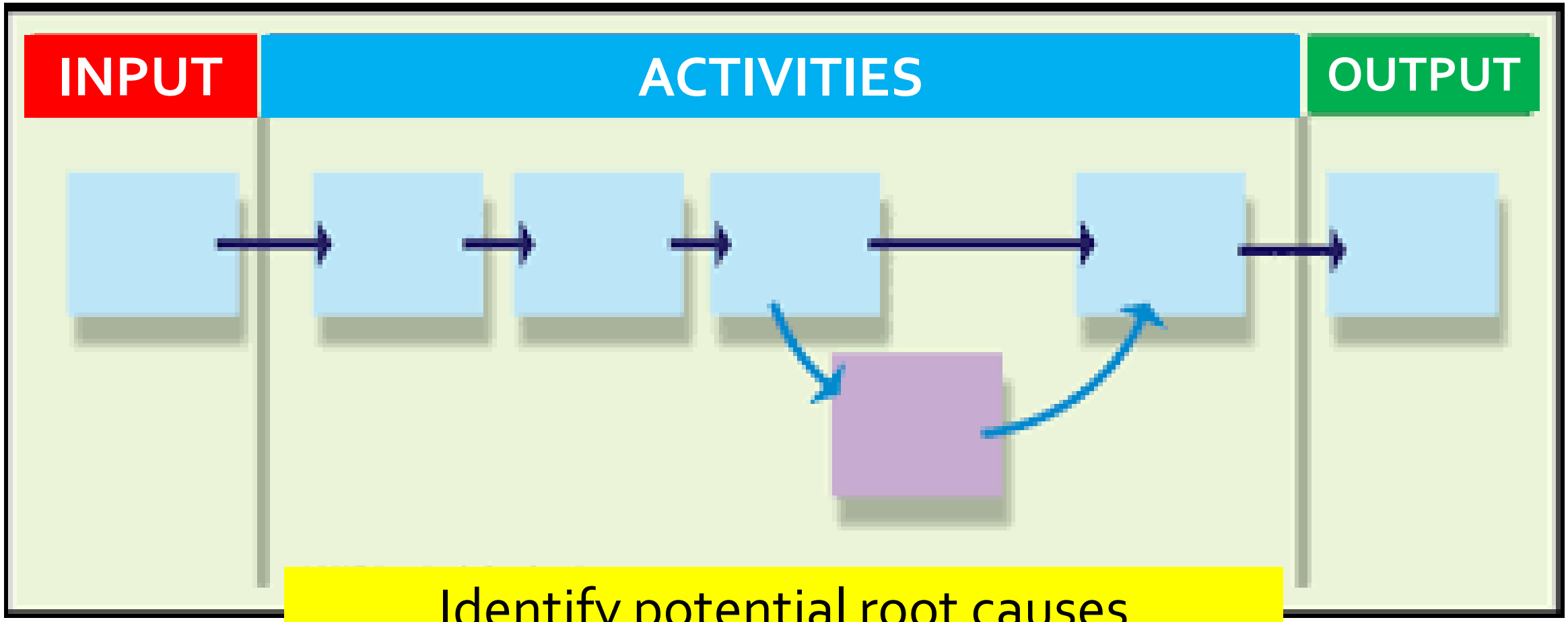
4 Steps of Systematic Problem Solving

Understand Causes

Focus on workflow

- Map & Analyze Process
- Identify Causes

Map and Analyze Process

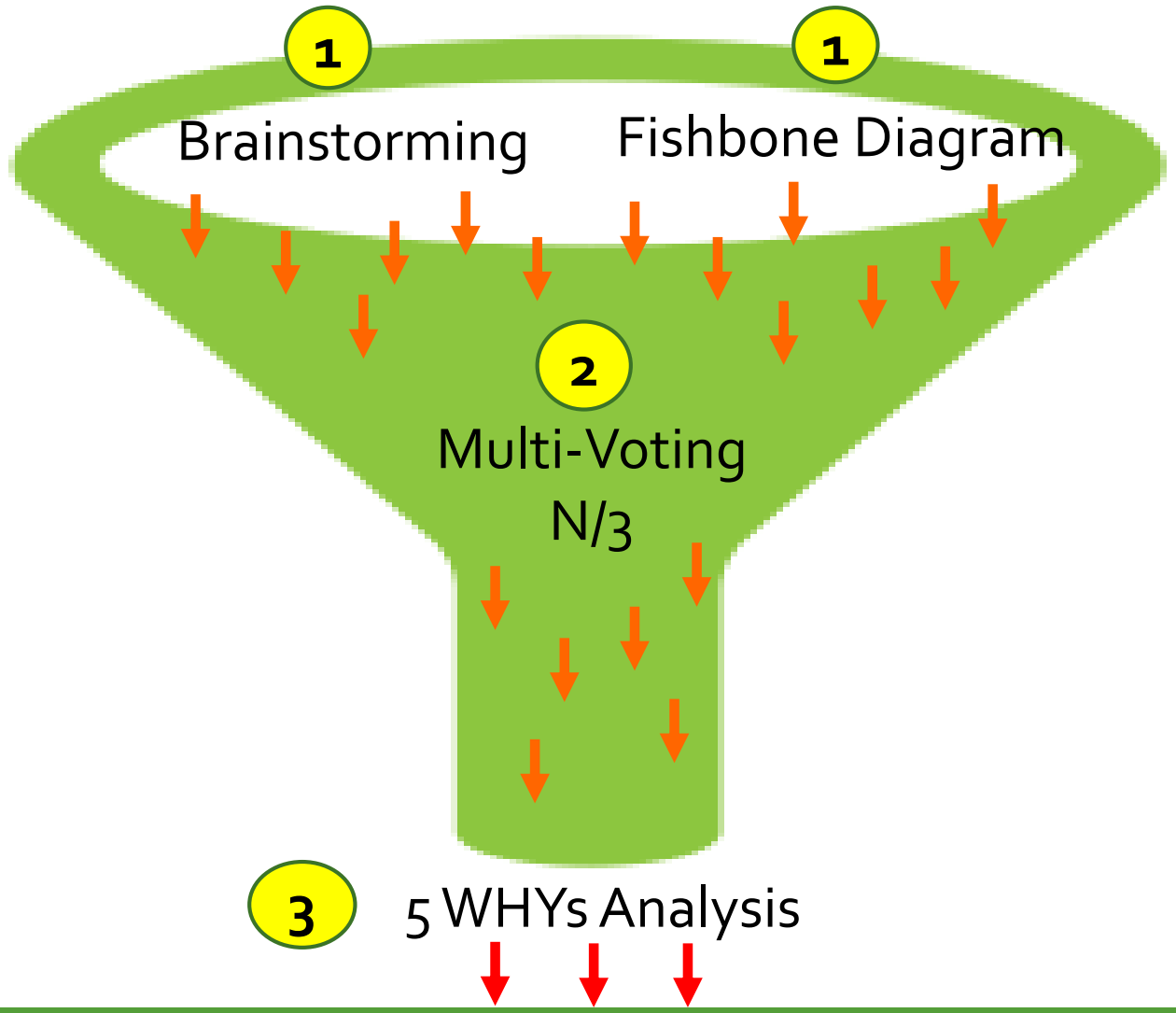


Identify potential root causes

8 WASTES

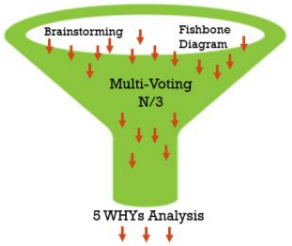
D	งานผิด
O	ผลิตเกิน
W	คอยนาน
N	ขีดความสามารถ
	ของพนักงาน
T	ย้ายบ่อย
I	สต็อคบาน
M	เดิน เอื้อม หัน
E	ขั้นตอนไร้ค่า

ระบุสาเหตุที่แท้จริง Identify Causes



1

การระดมสมอง Brainstorming



All ideas allowed

No negativity

Record Ideas

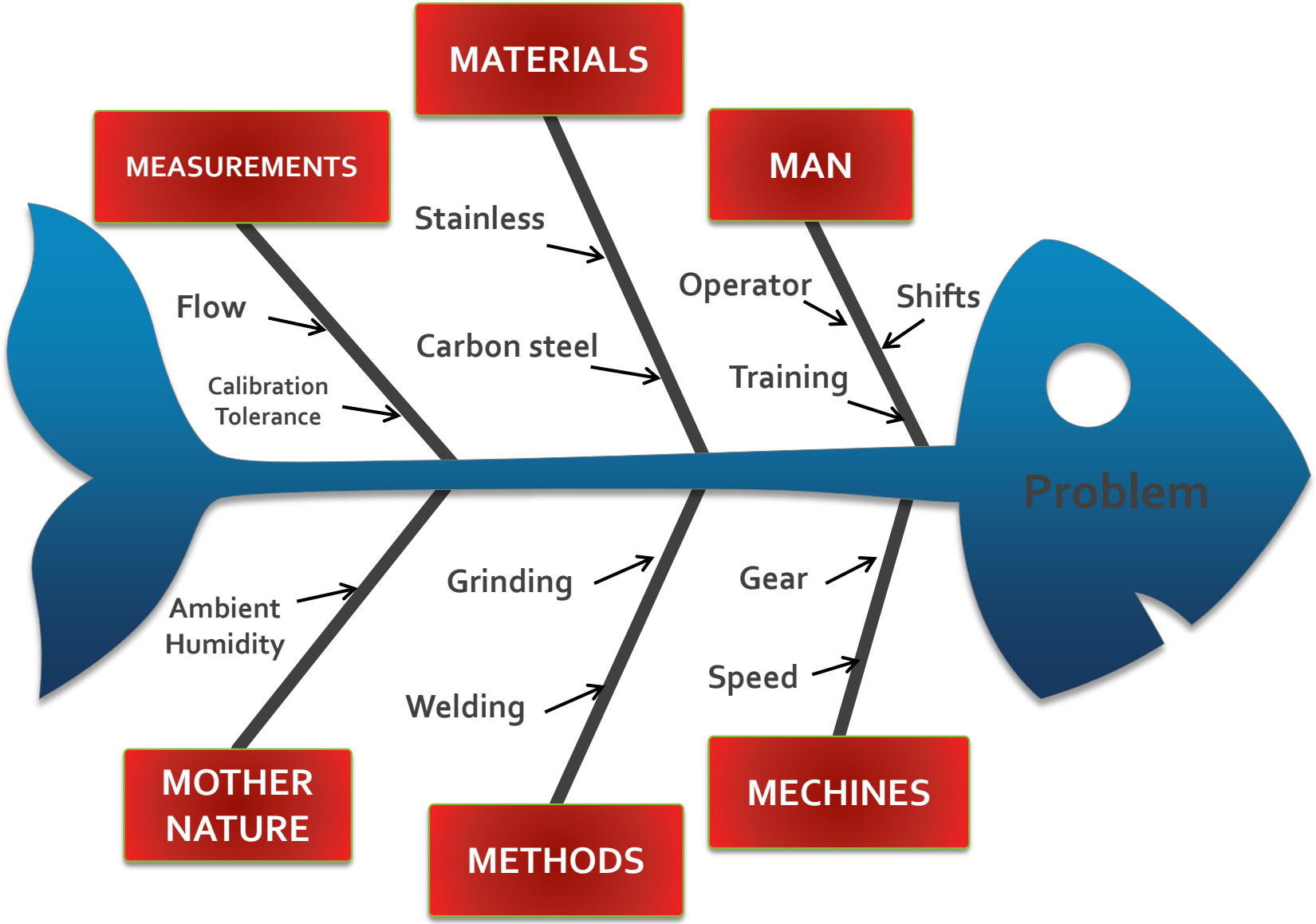
Everybody participates

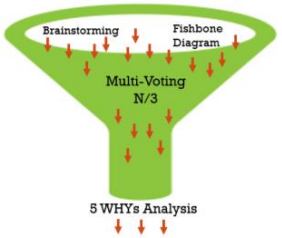
Open vs Silent

No judging at this point

1

แผนผังก้างปลา Fishbone Diagram

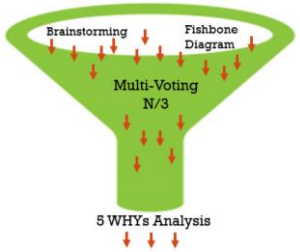




2

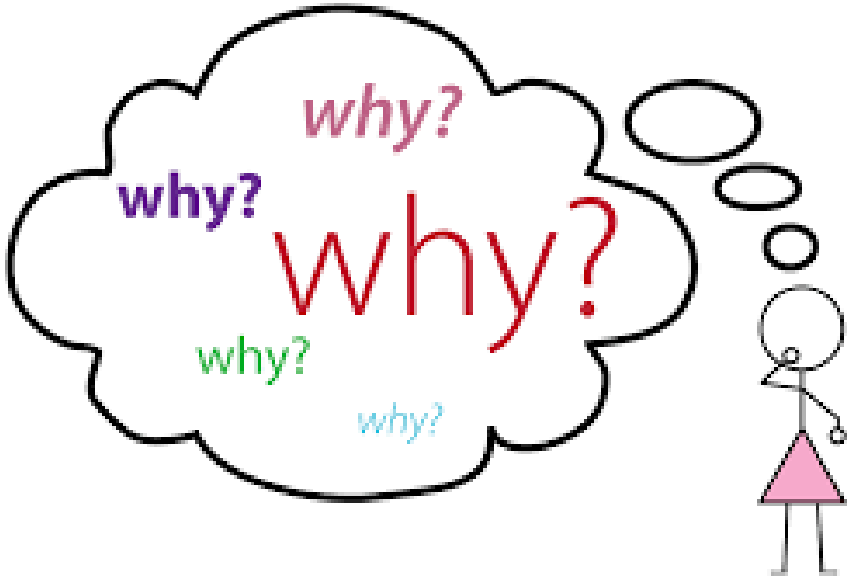
Multi-voting

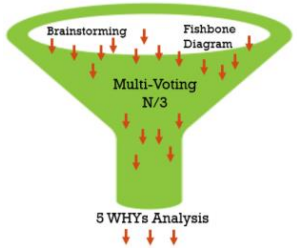
N/3

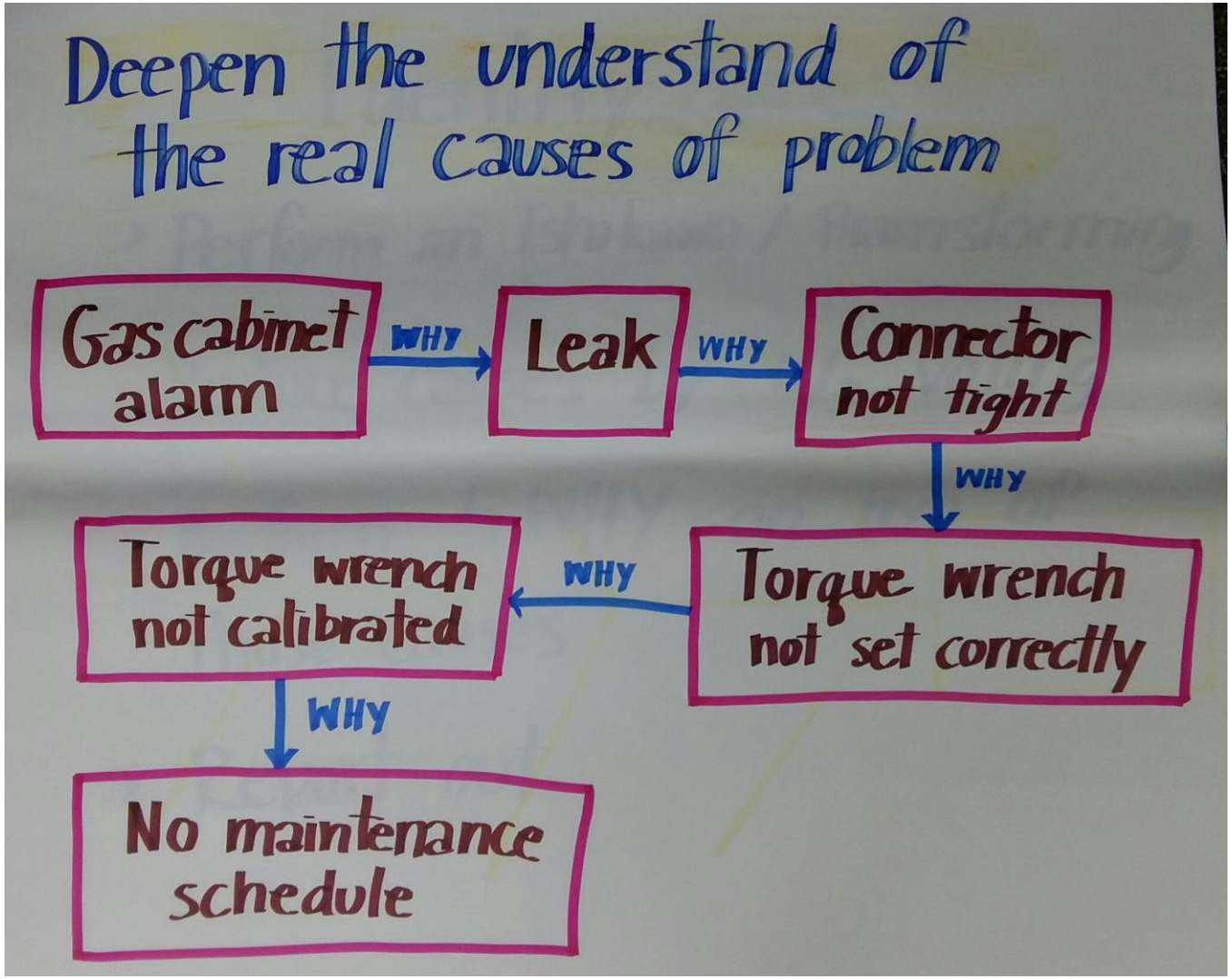


3

5 WHY ANALYSIS

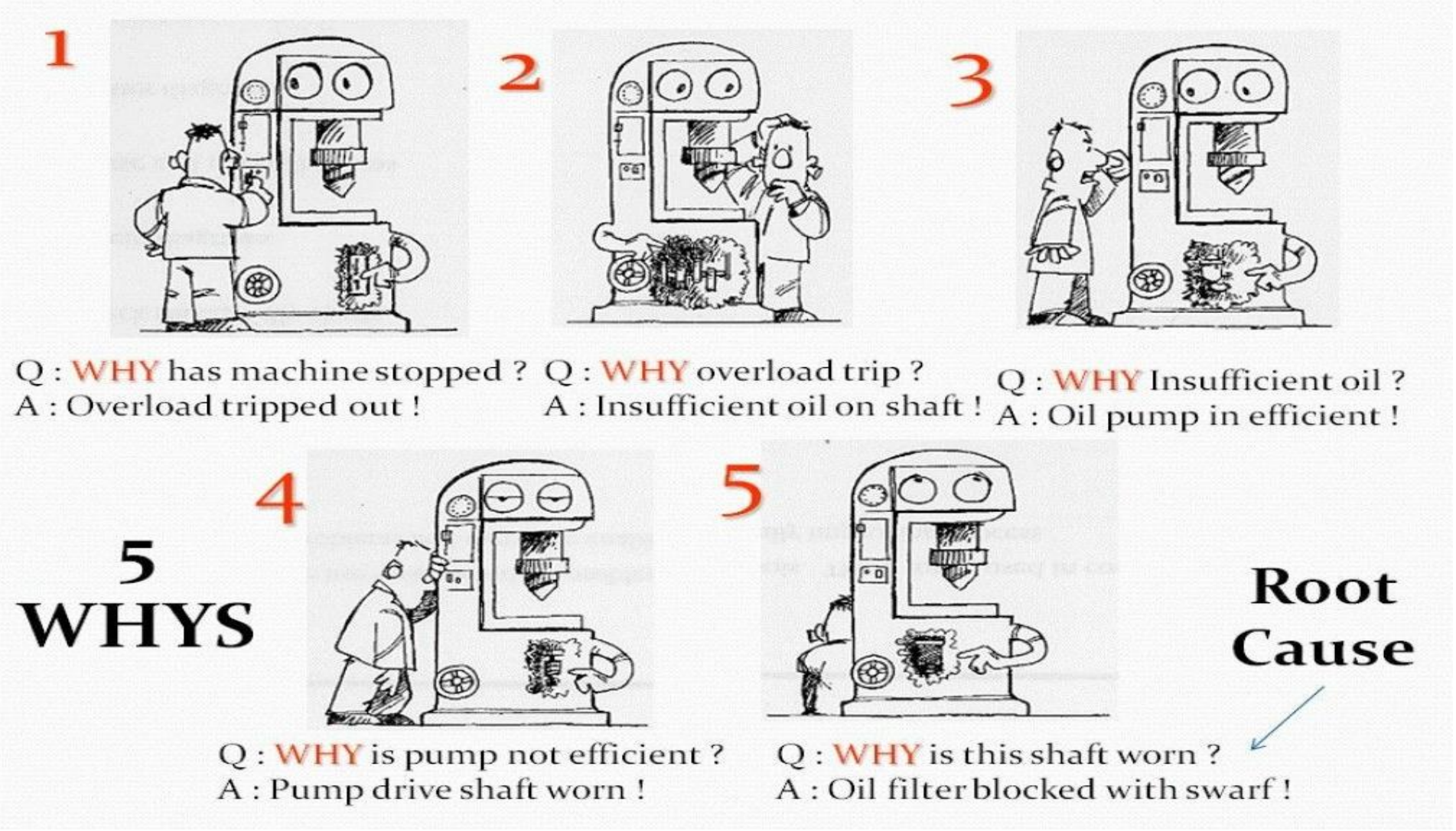






3

5 WHY ANALYSIS



Group Workshop 3

- Work in your team
- Brainstorm on Fishbone
- Reduce causes by N/3
- Perform 5 Why on one of causes
- Report out

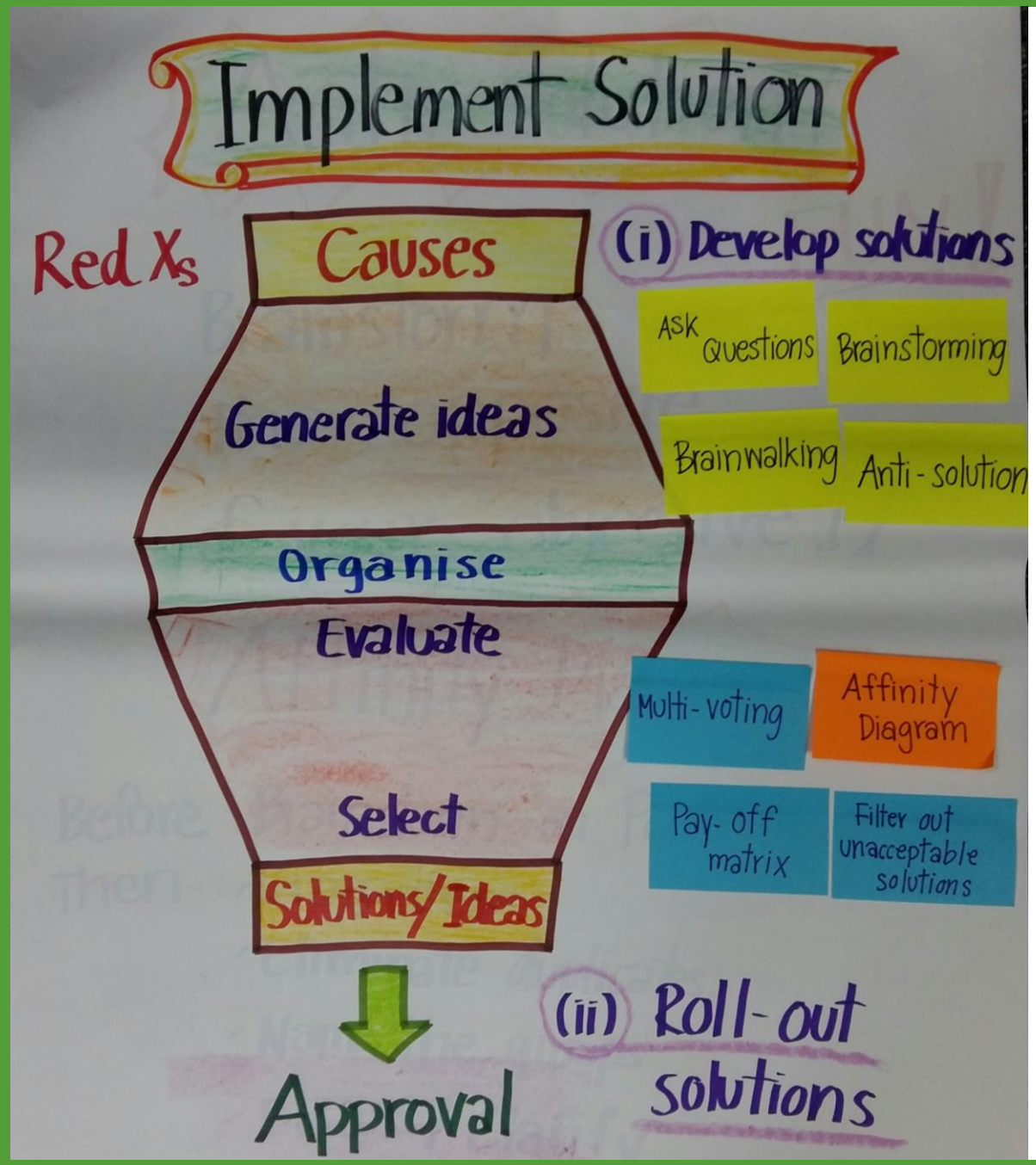
4 Steps of Systematic Problem Solving

Implement Solution

Using tools to screen out solution

- Develop Solution
- Roll-out Solution

Implement Solution



Anti - Solution

FUN!

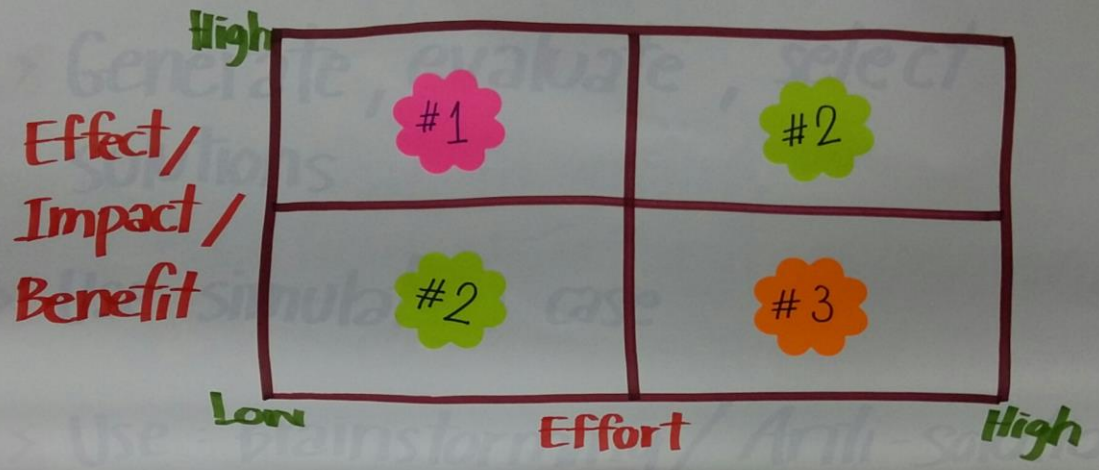
Brainstorm the opposite of your objective!!

Affinity Diagram

Before : Brainstorm on Post-its

Then :
- Gropp them
- Eliminate duplicates
- Name the groups
- Discuss / Clarify

Pay-off matrix



Cost vs Benefit

Effort vs Risk

Benefit vs Risk

Ease of implement vs Benefit

▷ Filter out Lower priority / Unwanted solution / Unacceptable solution

Wow that's a great solution, but what is the problem?

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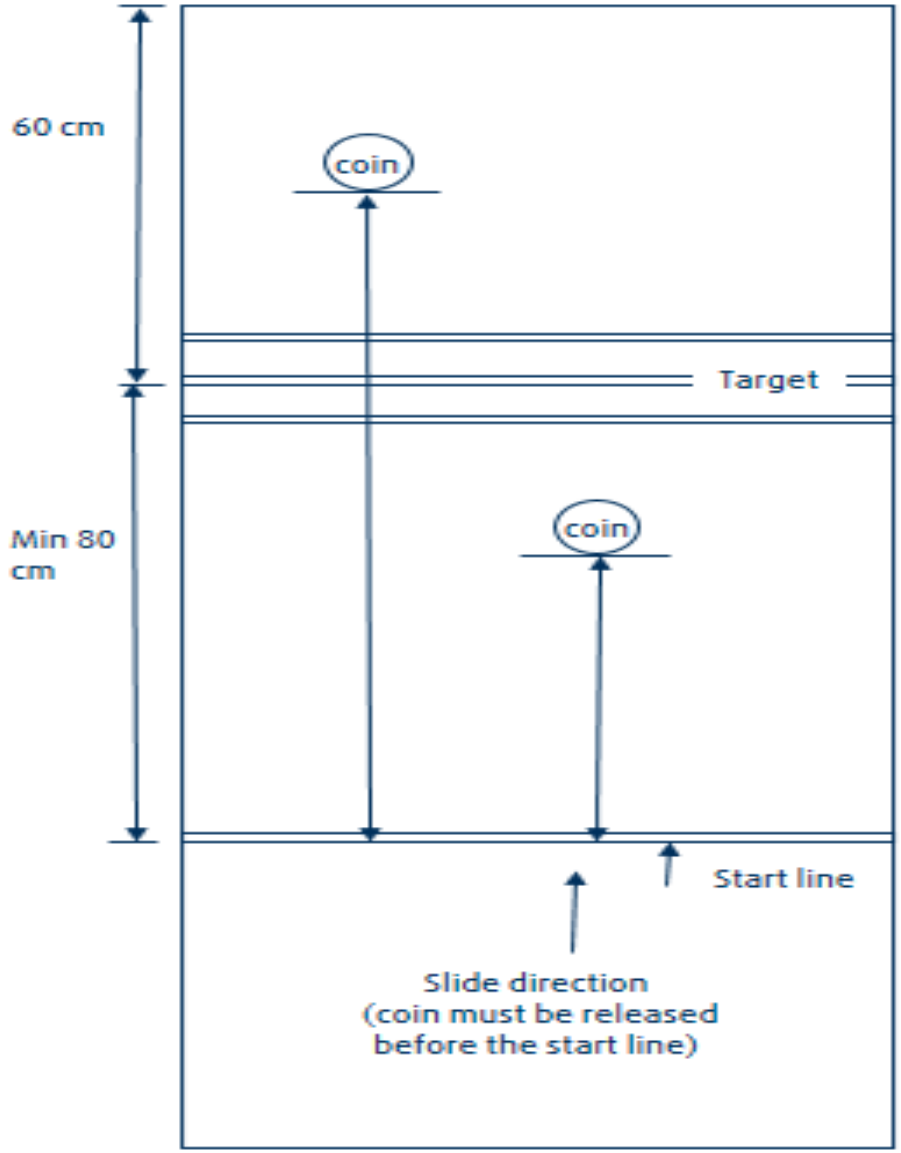
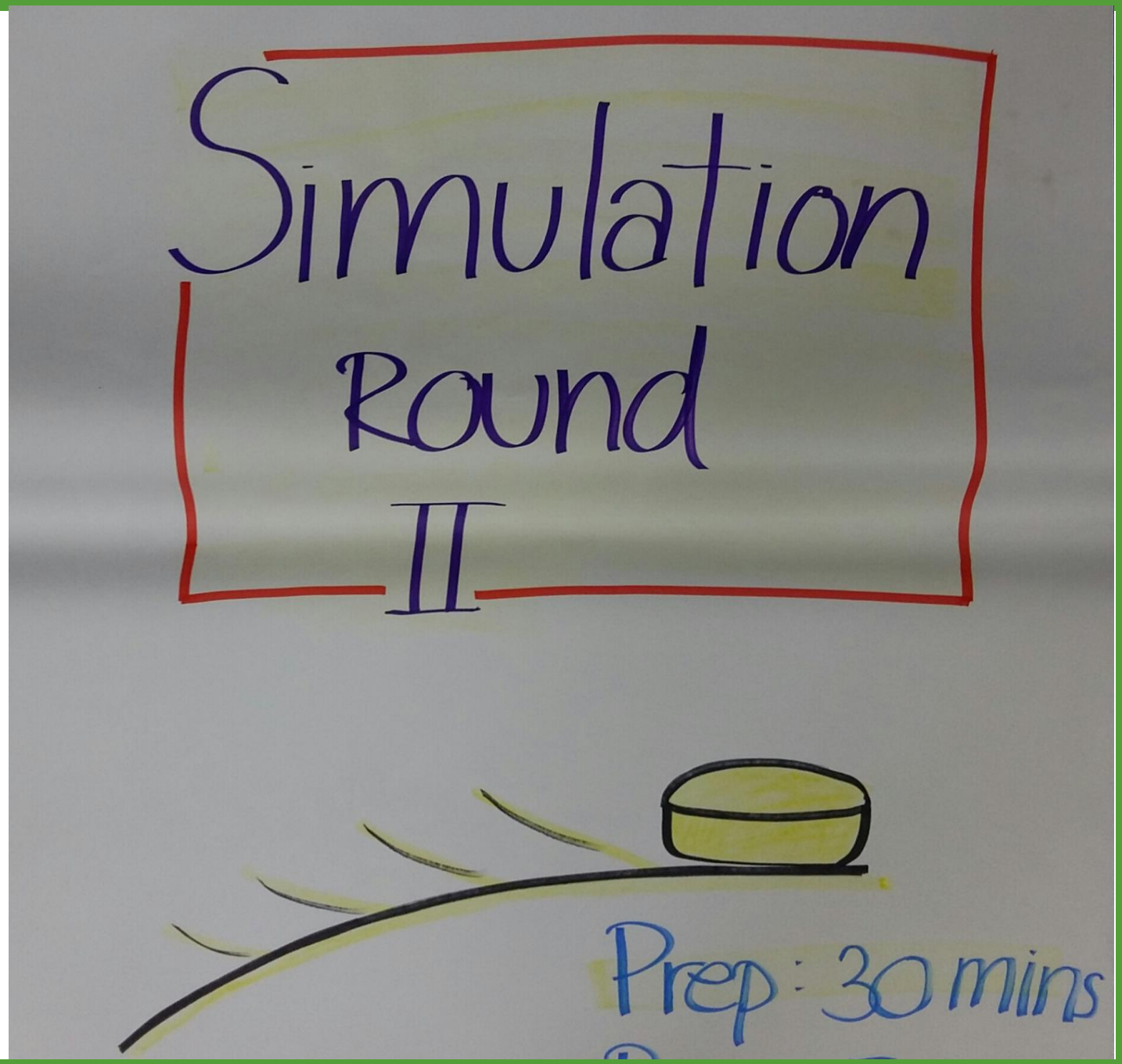
Simulation Round II





Roll-Out Solution

E = Q x A

Effectiveness Quality Acceptance

	Topics consider
	Action plan
	Communication plan
	Training plan
	Pilot?
	Required resources
	Approval for budget
	Define measures of success
	Role & responsibility of team

4 Steps of Systematic Problem Solving

Sustain Performance

How to sustain?

- Sustain Performance
- Visualize Improvements

Sustain Performance

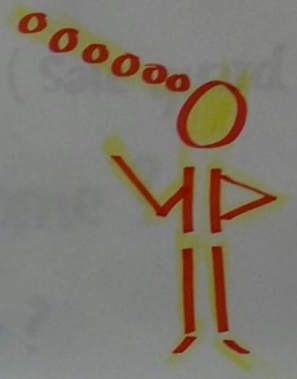
Why is it IMPORTANT?

- Not waste time
- Make future changes easier
- Keep our customers happy ☺
- Reliability
- Employee think we follow through
- Sustainable saving $

Why is it so DIFFICULT?

- We all hate changes
- People fall back to old habits
- New employee joining
- Lose long term visibility or reason for Δ
- Not being held accountable
- No motivation

So... How to sustain?



Poka-Yoke

- A method to
  - : Eliminate causes of problems at sources
  - : Let you know an error is occuring
  - : Detect / prevent error before the next operation is carried out

"Fail-safe" or "Mistake-proofing"

How to see sustain performance

Visualize Improvement

Visualise Improvement

Why?
- Show improvement made
- Sustain
- Measure goals met
- Paint picture that new process work

What
- Compare the problem before
- vs What it happening `New'

How
- Collect data
  - Check sheet
  - Distribution c/s
  - Concentration diagram
  - Download data
- Display data
  - Pareto / Bar / Pie
  - Trends / Time series

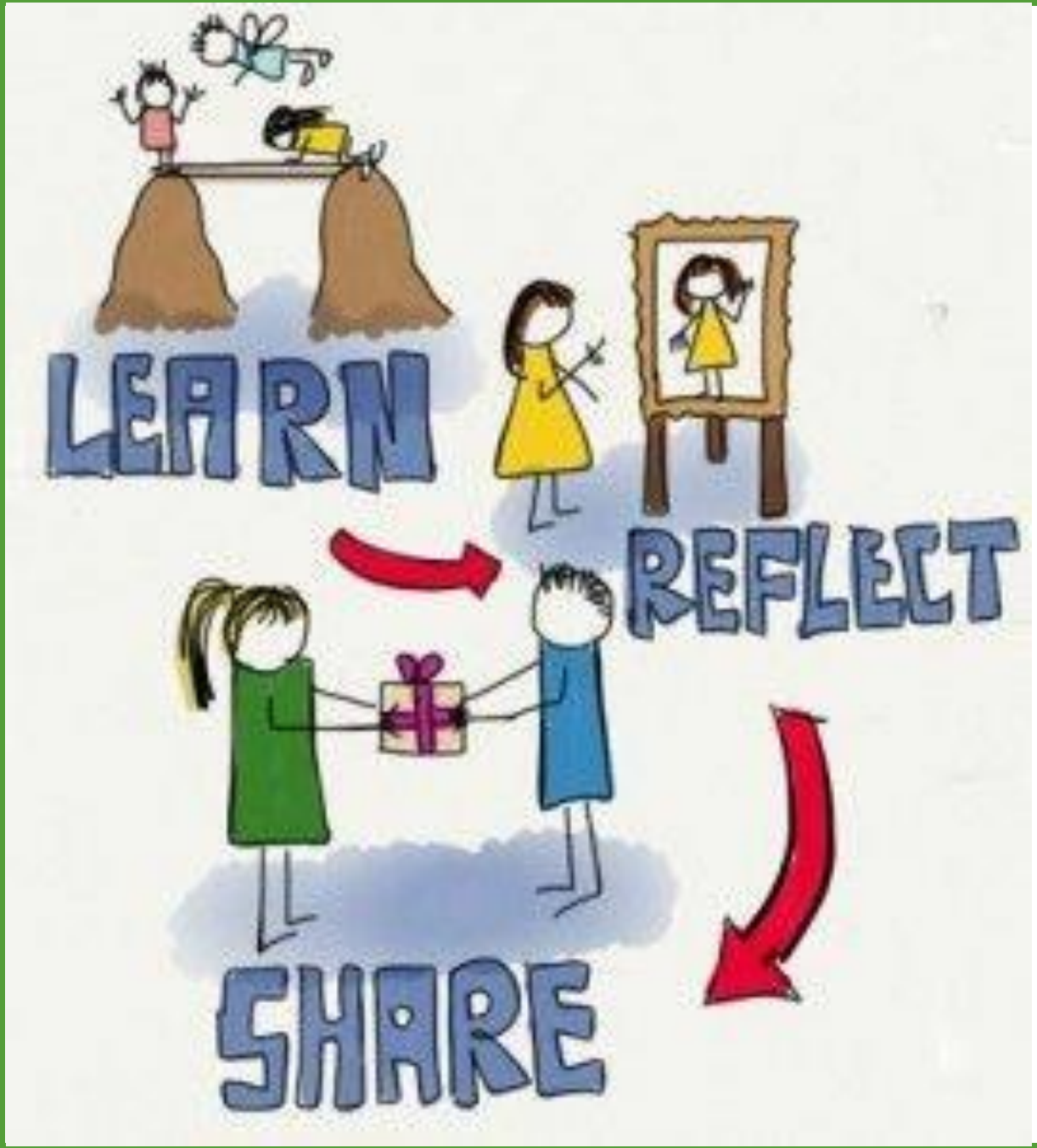
"If I had 60 minutes to solve a problem, I'd spend 55 minutes defining it, and 5 minutes solving it."

- Albert Einstein.

Teach them the Problem Solving

HOW TO APPLY INDIVIDUALLY AS A PROBLEM SOLVER?

การนำไปปรับใช้ในงานของตนเอง



Share Key Learning & How to Apply to Org?

สรุปการเรียนรู้และการนำไปปรับใช้ในงาน

FEEDBACK please