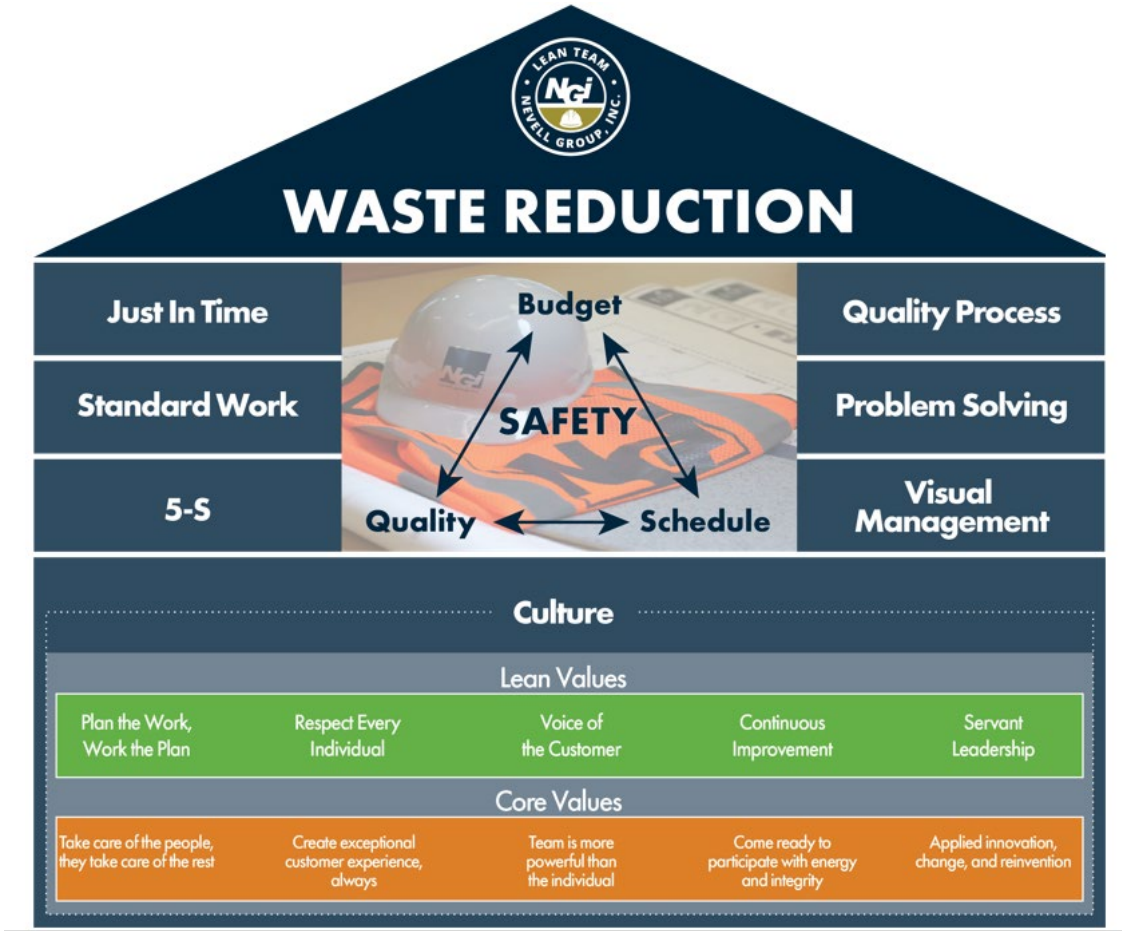
Nevell Group Lean Training

7-Step Problem Solving Method

Objectives

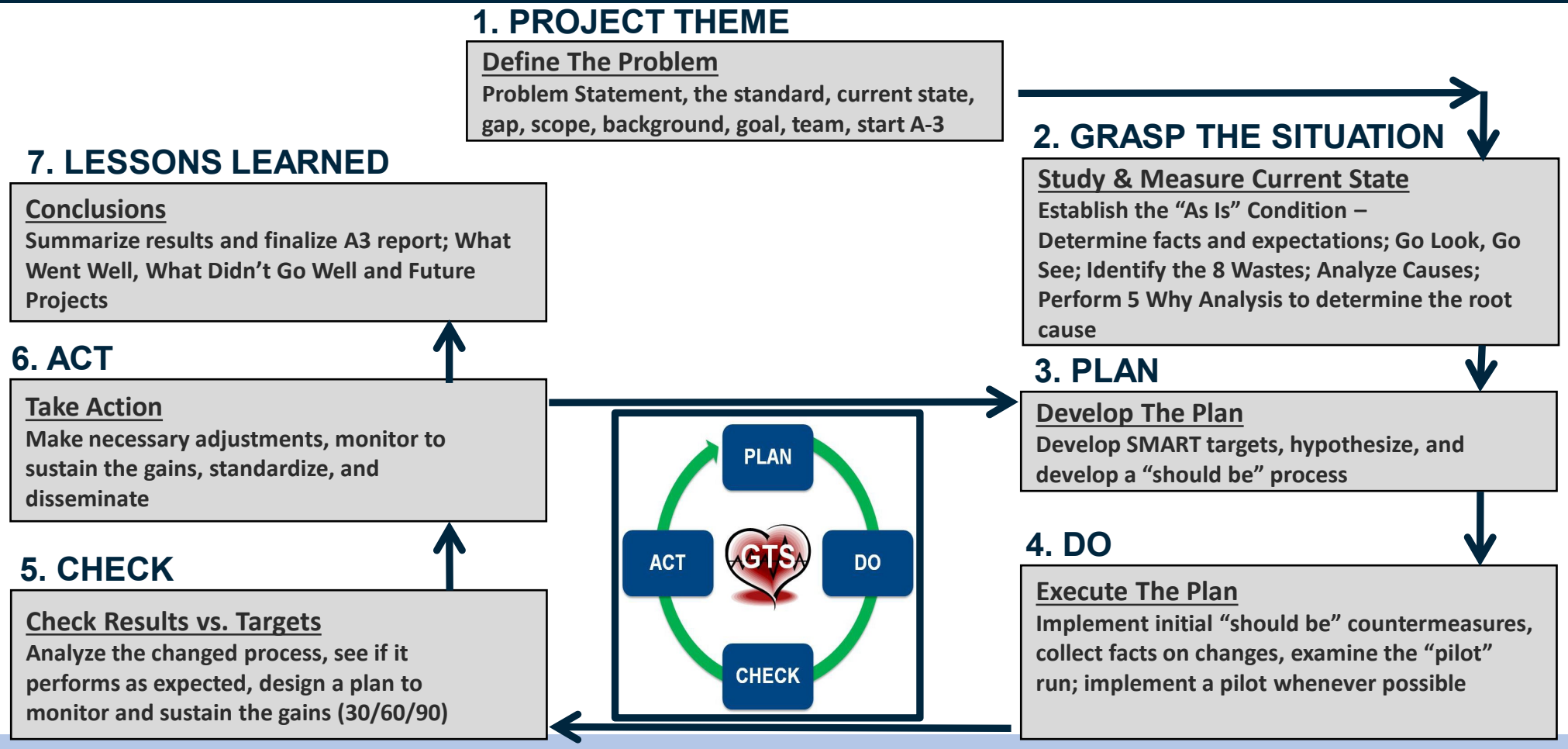
- 7-Step Problem Solving Method
  - Project Theme
  - Grasp the Situation
  - Plan
  - Do
  - Check
  - Act
  - Lessons Learned
- A-3 Review
- Questions

Lean House


LEAN TEAM
NGI
NEVELL GROUP, INC.
WASTE REDUCTION
Just In Time
Standard Work
5-S
Budget
SAFETY
Quality
Schedule
Quality Process
Problem Solving
Visual Management
Culture
Lean Values
Plan the Work, Work the Plan
Respect Every Individual
Voice of the Customer
Continuous Improvement
Servant Leadership
Core Values
Take care of the people, they take care of the rest
Create exceptional customer experience, always
Team is more powerful than the individual
Come ready to participate with energy and integrity
Applied innovation, change, and reinvention

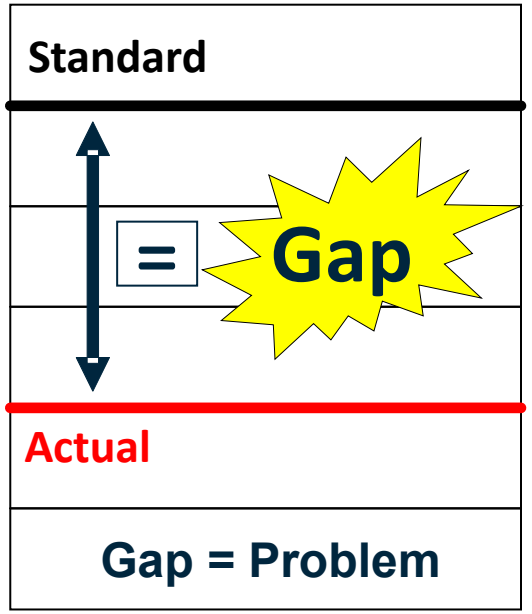
Problem Solving

7-Step Problem Solving Method



What is a Problem?

- A Problem is a discrepancy, or gap, between a standard or expectation, and the actual or current state



- More simply put…it's a deviation from the standard

Finding the Gap

- In order to find the gap, you need a clear standard and current performance
  - Clear standard
    - Is written or commonly understood by all
    - Has a measureable performance base
  - Current performance
    - A measurement of how the process is currently performing
    - Used as a baseline to measure improvement
    - Has clearly understood data points

Good problem solving requires data driven decision making.
If we do not have a baseline, how will we know we are better?

Identifying Problems

- Problem solving starts with a good problem statement
- Properly stating a problem requires a clear assessment of the following:
  - The Gap between the “Standard” & “Current” conditions
  - The Impact as it affects Safety, Quality, Budget, or Schedule
  - The Urgency for a countermeasure
- Too often we move quickly into “problem solving” without clear problem statements and no data
  - This leads to attacking the symptom rather than root cause
  - Leads to scope creep which takes us off target

The Critical Step

- Develop a good problem statement

Really Bad Problem Statements

- We need to clean up this jobsite
- We need to change how we do timecards
- We need less cost codes
- We need to cut back our crew

Are these problem statements?

Better Problem Statements…But Still Bad

- This job site is always a mess, we need to fix it
- It takes too long to do timecards, let's change the process
- Our foremen do not spend enough time with the crew
- We have too many guys on this job site, let's cut some guys

- Where is the data? What is the standard…current state…gap?

This is normally where we start our problem solving

The Start of a Problem Statement

- “It feels like…”
- “I think we…”
- “It seems like…”
- “We may have…”

Your problem statement is a hypothesis until you prove it with data

The Start of Good Problem Statements

- “It feels like” this job site is always a mess
- “I think it” takes too long to do timecards
- “It seems like” we have too many cost codes
- “We may have” too many guys on this job site

What is still missing?

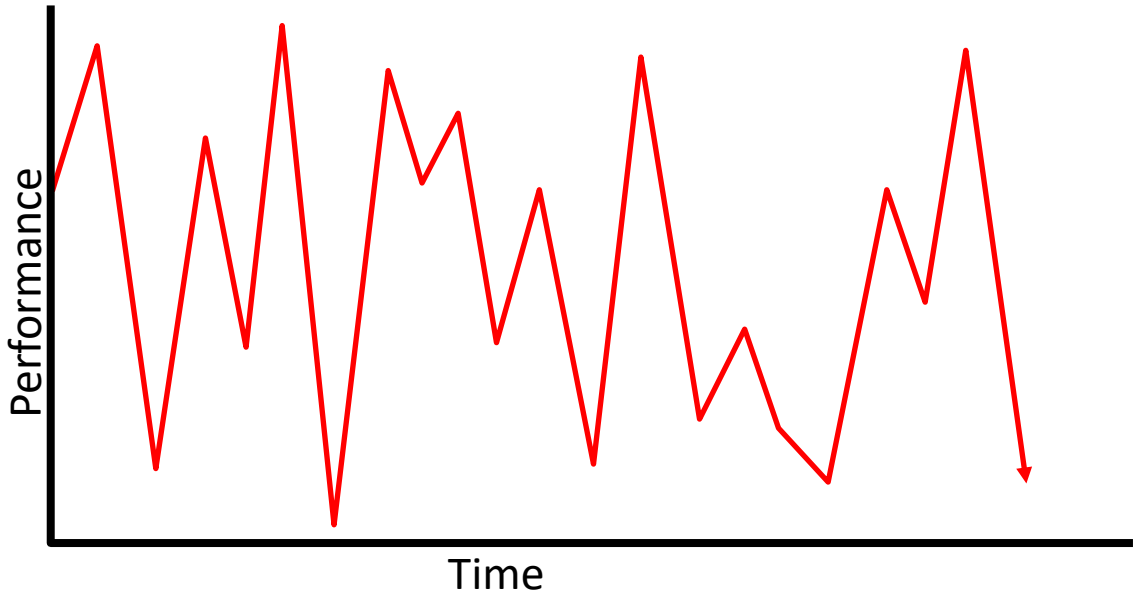
Better Problem Statements

- Team 3 has failed 8/10 5-S audits, let's improve that by 50%
- Our foremen are spending 8% of their day on timecards, we want that to be under 1%
- In a study of 10 foremen from all 3 branches, on average they spent 58% of their day with the crew, the goal is 80%
- The budget/schedule for St. Michael's shows 250 hours remaining for framers, but the current workforce projects to use 380 hours

What do you see as the biggest challenge to getting these problem statements?

Working With Process Problems

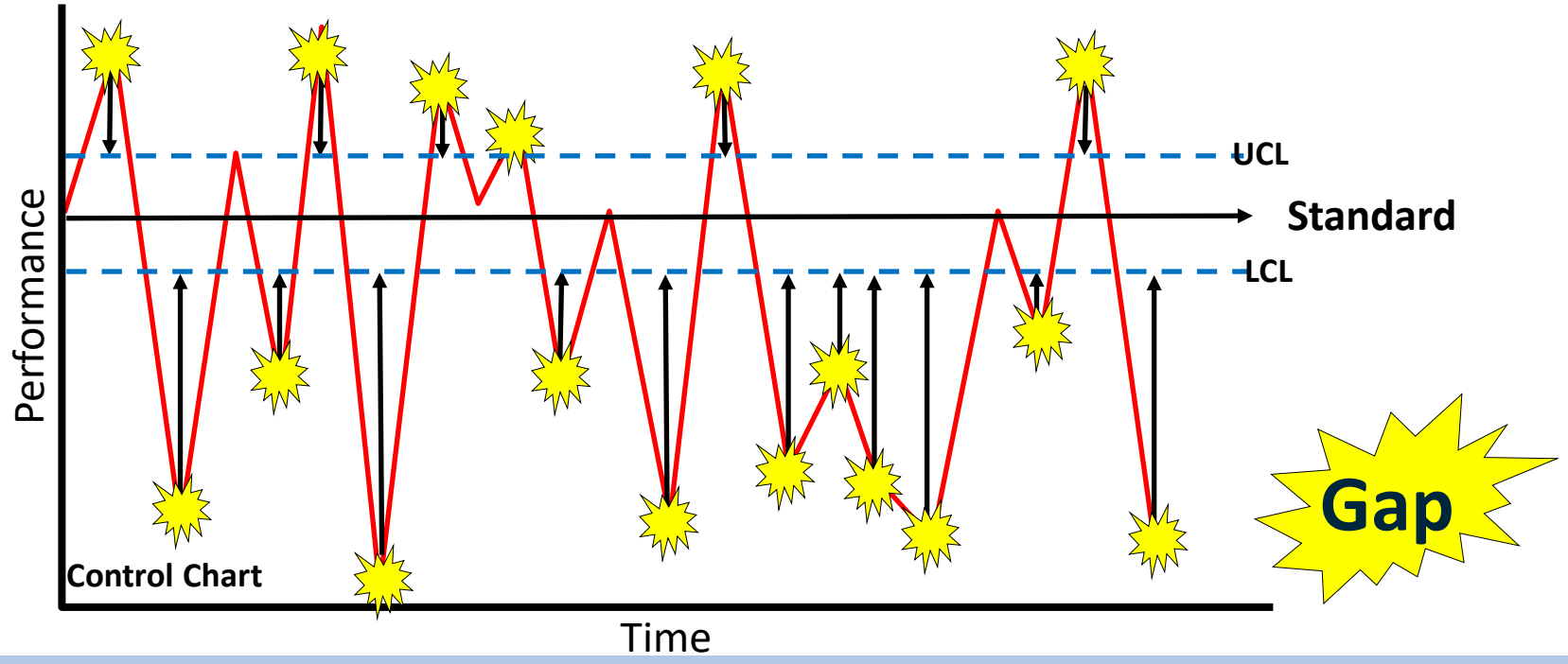
- The Current “As Is” process performance must be measured and documented.



Can you see a Gap / Problem yet?

Working With Process Problems

- But when you add the standard and limits…the problems (gaps) become visible



Waste Watchers

- Most gaps between standard and actual are the results of waste in the process
- **We all need to develop an "Eye for Waste" so we can all be problem solvers**

8 Wastes?

- T-transportation
- I-inventory
- M-motion
- W-waiting
- O-over processing
- O-over production
- D-defects
- U-unused creativity

Dealing With Gaps/Problems

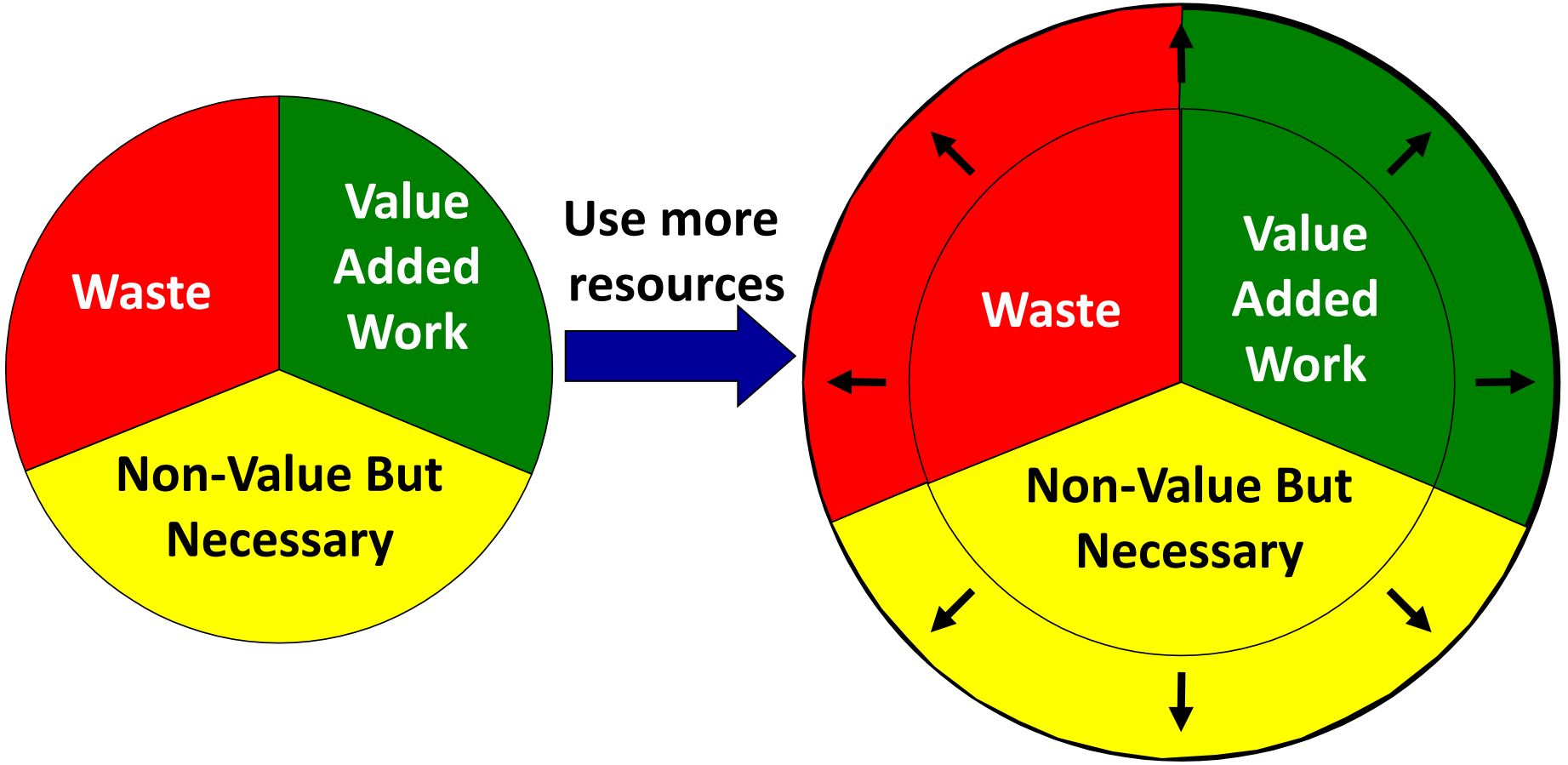
- We celebrate the fact that we have identified a Gap / Problem because it's an opportunity to improve, but we NEVER stop there.
- We categorize Problems into 3 different categories:
  - Quick Wins (1 day to a few weeks)
  - Problem Solving Events (2-6 months)
  - Long Term (Transformational) Initiatives (6-12 months)
- All of these can be improved using the 7 Step Problem Solving Methodology

Culture of Problem Solvers

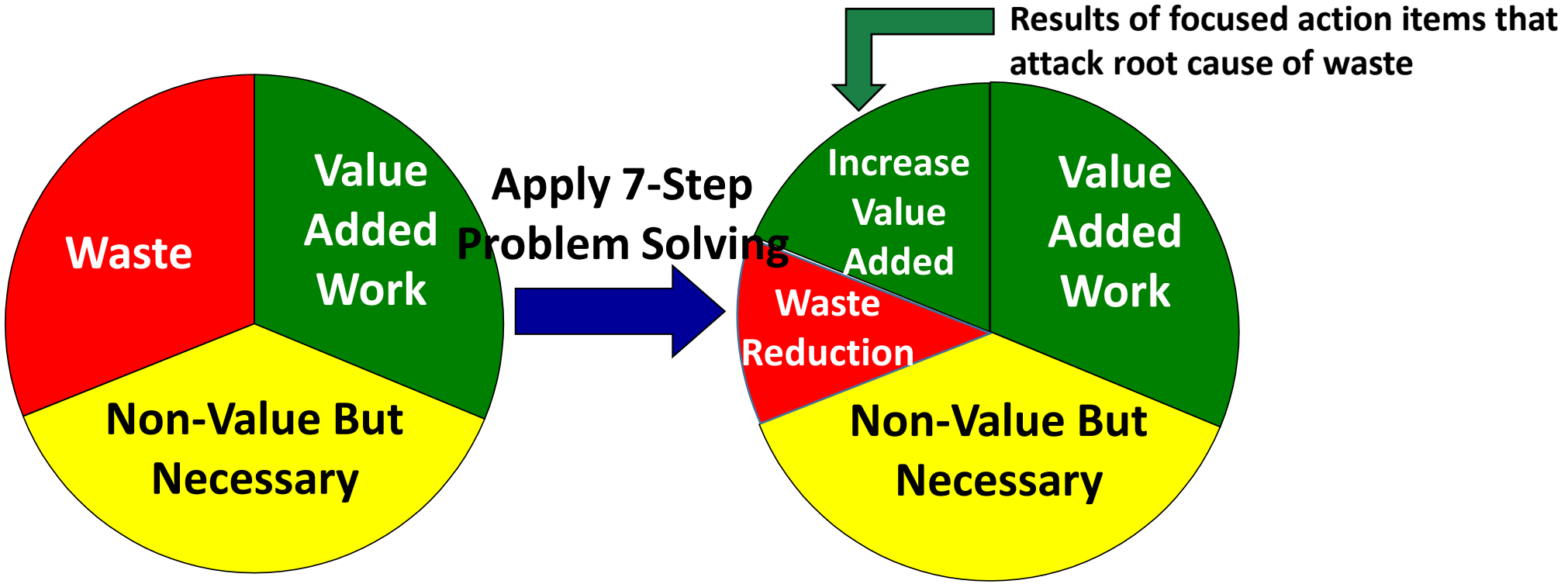
- NGi must shift from fire fighting symptoms of problems to developing a strategy of root cause problem solving
- We must stop trying to solve problems based off a hunch, we need data to be true problem solvers
- All levels of leadership must shift from the “Blame Game” to supporting teams in solving problems at all levels of the organization

“SMART LOVES PROBLEMS” - IBM

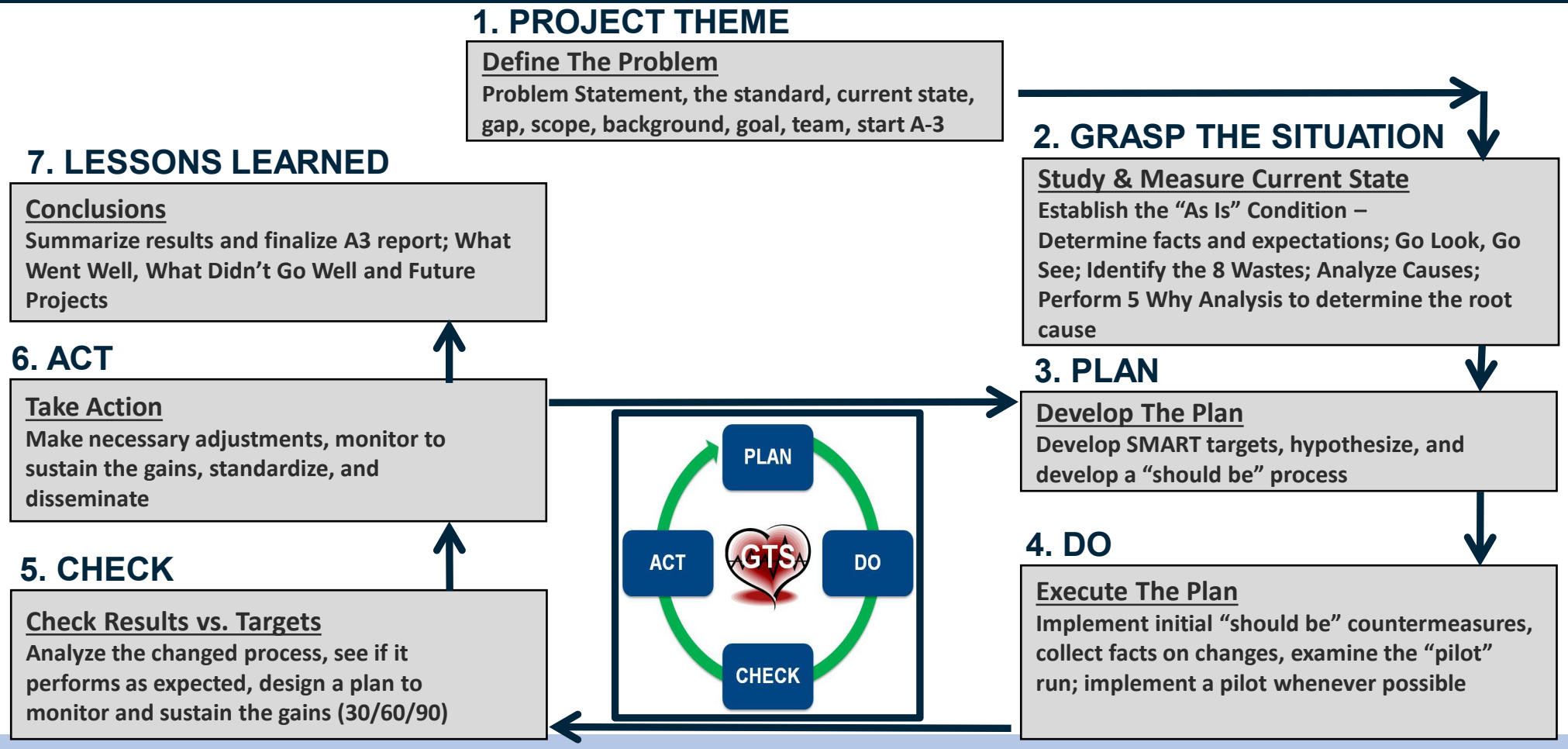
Old Way to Problem Solve



Problem Solve the Root Cause of Waste



7-Step Problem Solving Method



Step 1: Project Theme

1. PROJECT THEME

Define The Problem

Problem Statement, the standard, current state, gap, scope, background, goal, team, start A-3

Your problem statement is a hypothesis, you need to prove it with data

Problem Solving Team

- Project Champion
  - Usually a senior manager or executive
  - Responsible for ensuring the problem solving event is a priority and removing constraints for the team
- Team Leader
- Facilitator
- Team Members

Step 2: Grasp The Situation

2. GRASP THE SITUATION

Study & Measure Current State

Establish the "As Is" Condition –
Determine facts and expectations; Go Look, Go See; Identify the 8 Wastes; Analyze Causes; Perform 5 Why Analysis to determine the root cause

Step 3: Plan

3. PLAN

Develop The Plan

Develop SMART targets, hypothesize, and develop a "should be" process

SMART

- Specific
  - Succinct goal that clearly understood
- Measurable
  - Should address questions such as how much, how many, how will I know when accomplished?
- Achievable
  - Realistic and attainable within the timeframe and resources given
- Relevant
  - On target and worthwhile in achieving the goal
- Timely
  - ALWAYS GIVE A DUE DATE

Step 4: Do

The most important step:

WE HAVE TO DO WHAT WE SAY WE ARE GOING TO DO!!

4. DO

Execute The Plan

Implement initial "should be" countermeasures, collect facts on changes, examine the "pilot" run; implement a pilot whenever possible

Step 5: Check

5. CHECK

Check Results vs. Targets

Analyze the changed process, see if it performs as expected, design a plan to monitor and sustain the gains (30/60/90)

Step 6: Act

6. ACT

Take Action

Make necessary adjustments, monitor to sustain the gains, standardize, and disseminate

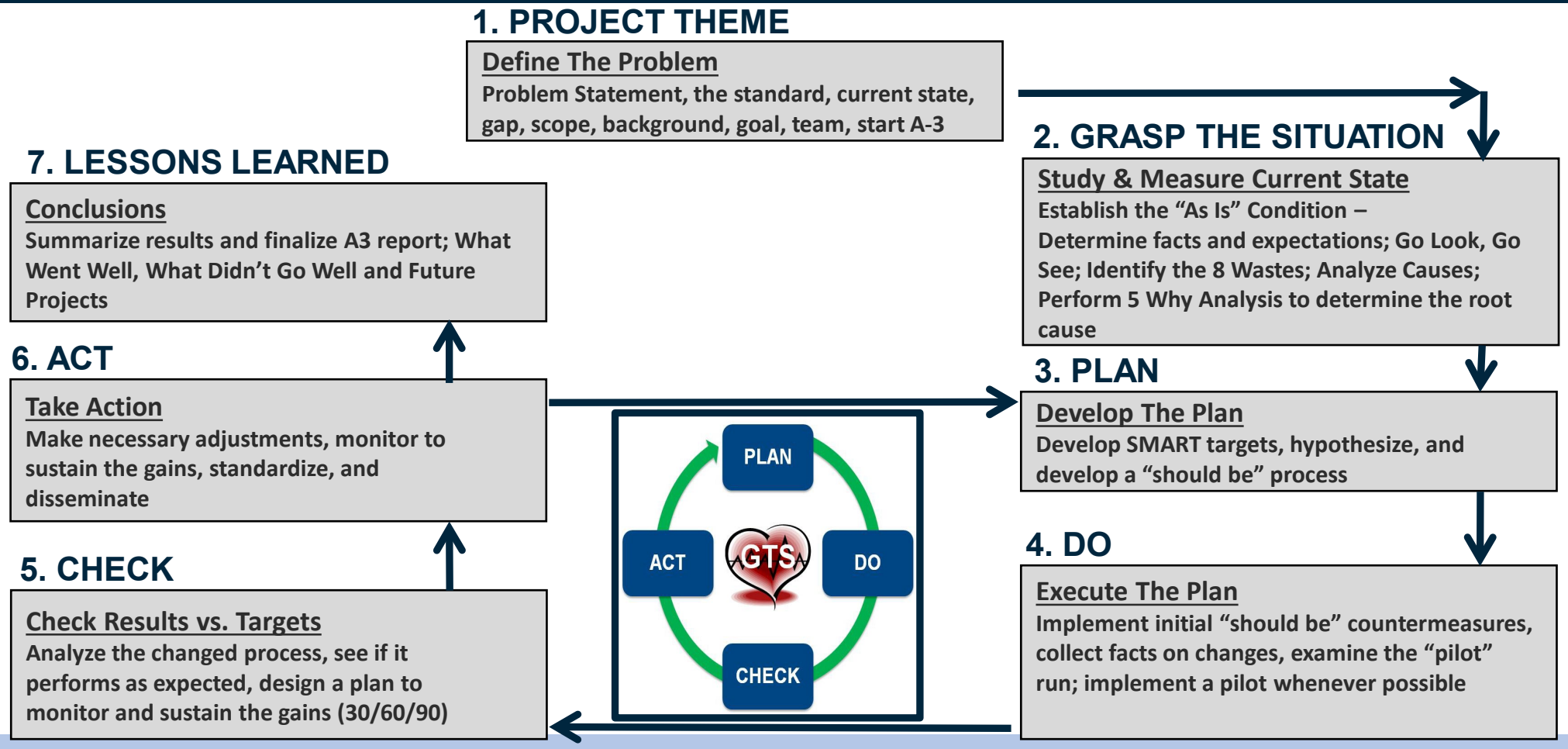
Step 7: Lessons Learned

7. LESSONS LEARNED

Conclusions

Summarize results and finalize A3 report; What Went Well, What Didn't Go Well and Future Projects

7-Step Problem Solving Method



Tools for Problem Solving

- A-3
- 5-Questions for every A-3
- Pre-Planning Worksheet
- PICK chart
- Fishbone diagram
- 5-Why's
- Obeya Room

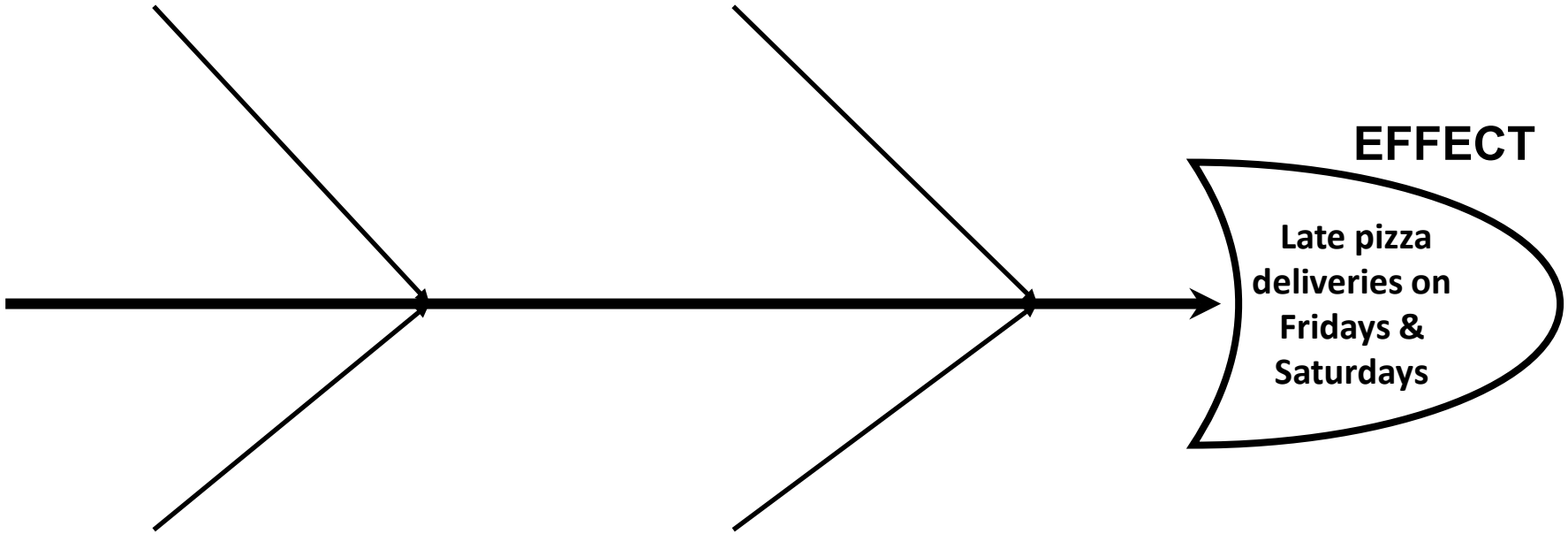
A Closer Look at Obeya Rooms:

- Usually held in corporate office
- Used to visually see all current transformational projects
- Broken up into Operational Areas and functional areas

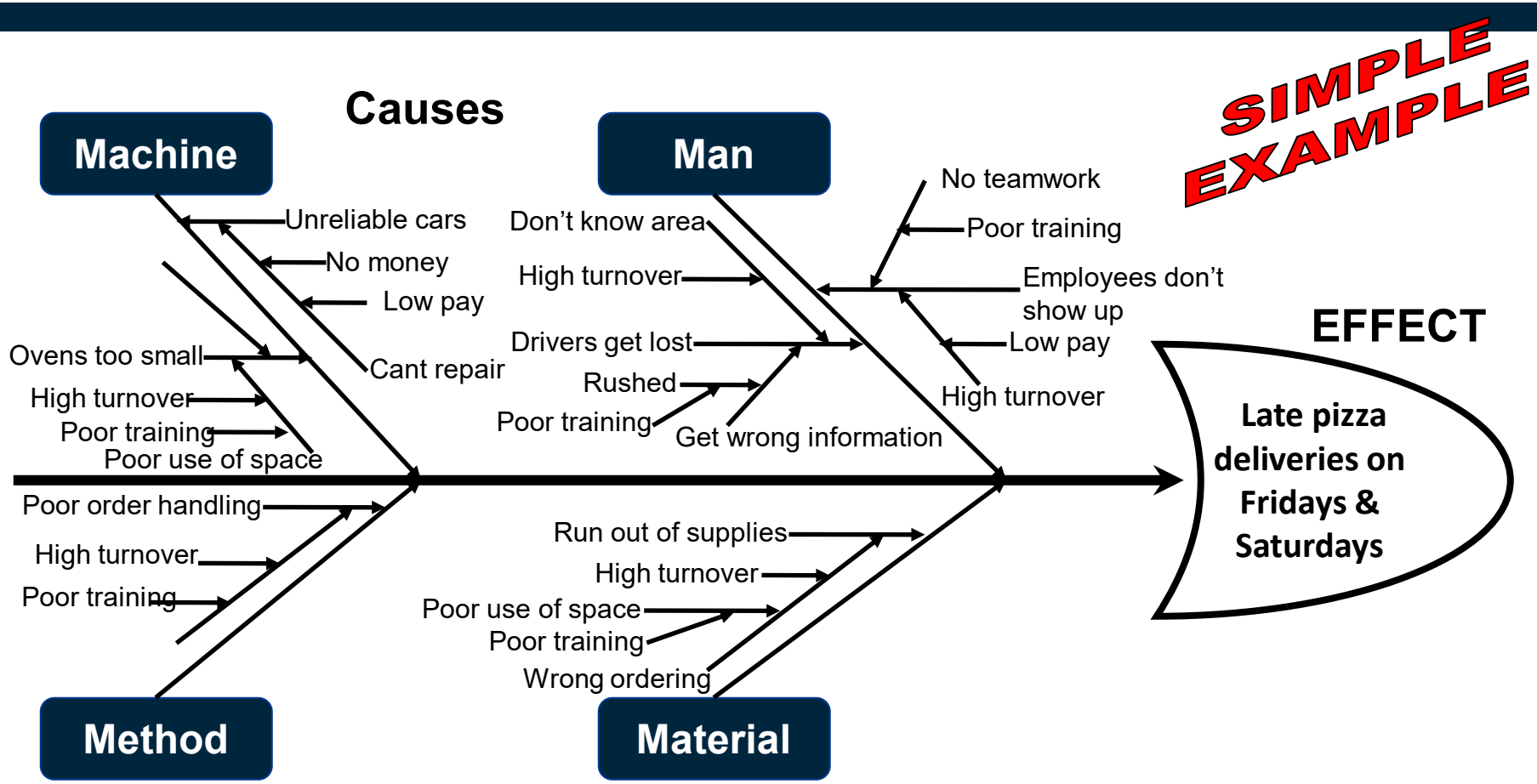
Fishbone Diagram

- It is one type of cause and effect diagram (there are several others)
- The Cause and Effect diagram is used to explore all the potential causes (inputs) that result in a single effect (output)
- Brainstorm all possible causes based on the following:
  - Data analysis
  - Go Look, Go See
  - Experience
- *“Causes” are typically arranged into four major categories*
  - Man, Method, Machine, Material

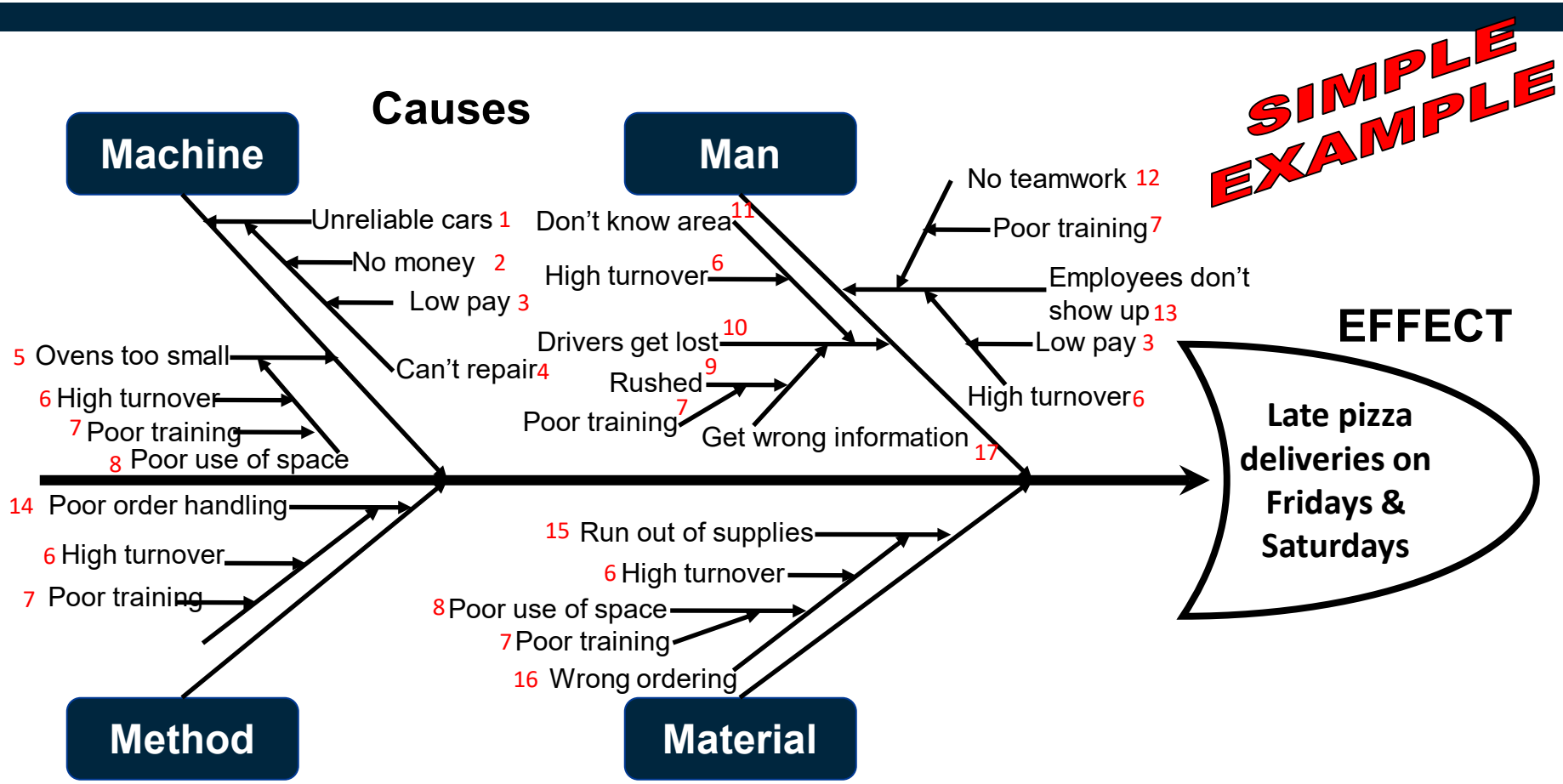
Fishbone Example-Start With Problem



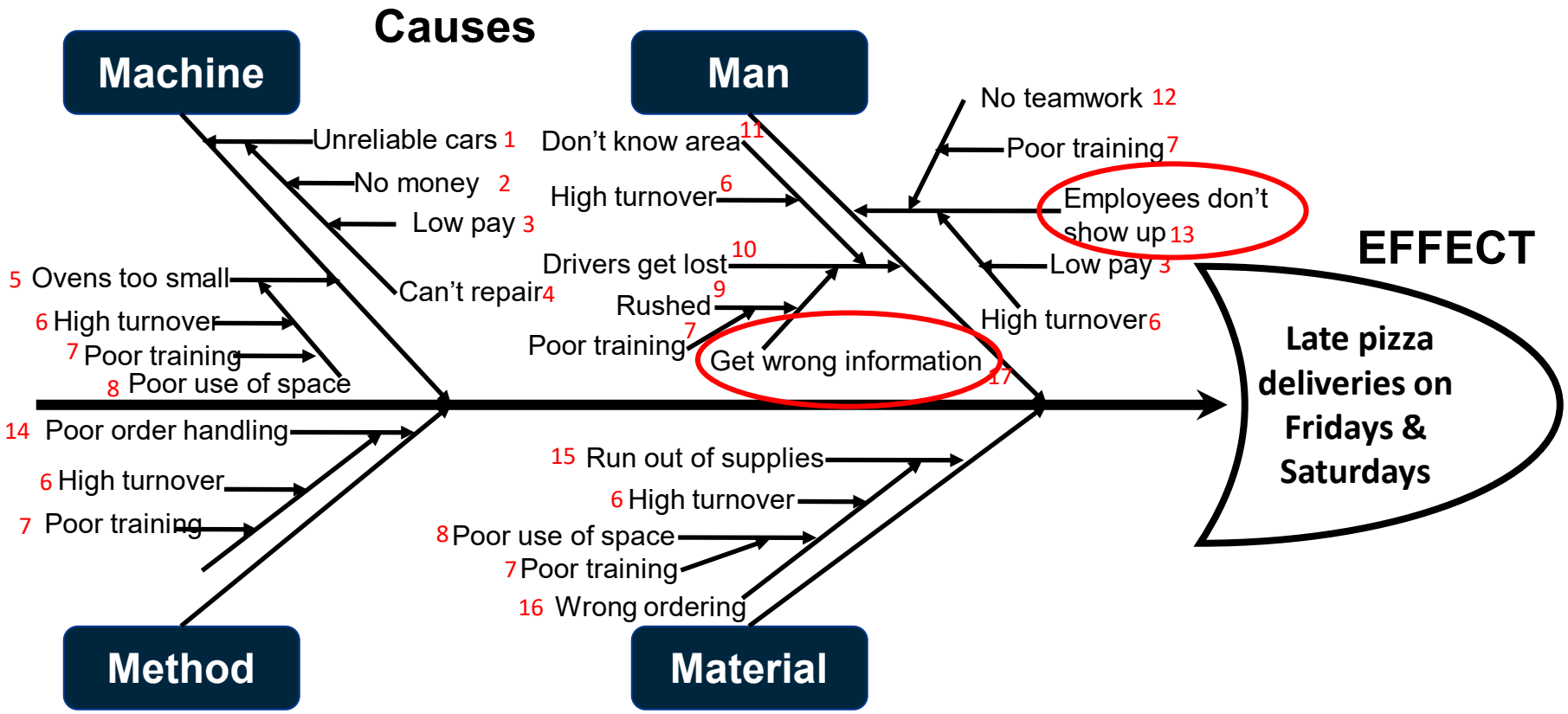
Fishbone Example-Brainstorm Causes



Fishbone Example-Number Each Cause

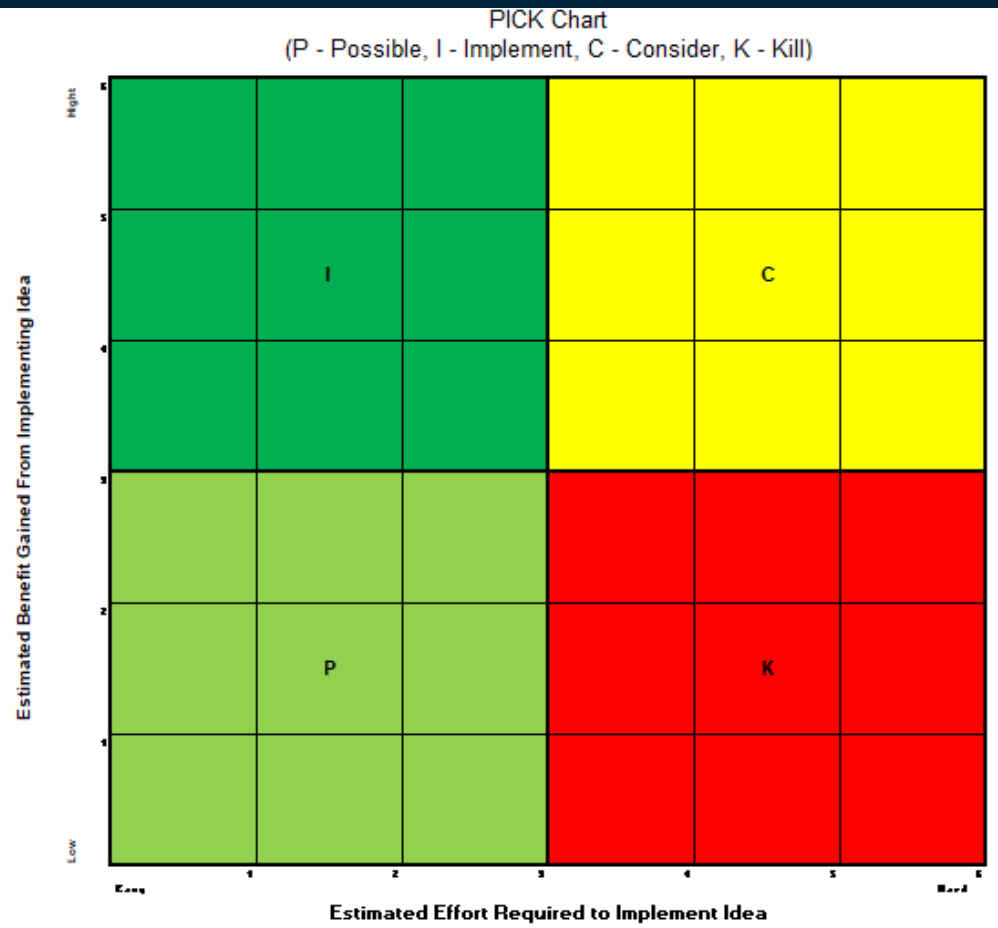


Fishbone Example-ID Root Cause(s)

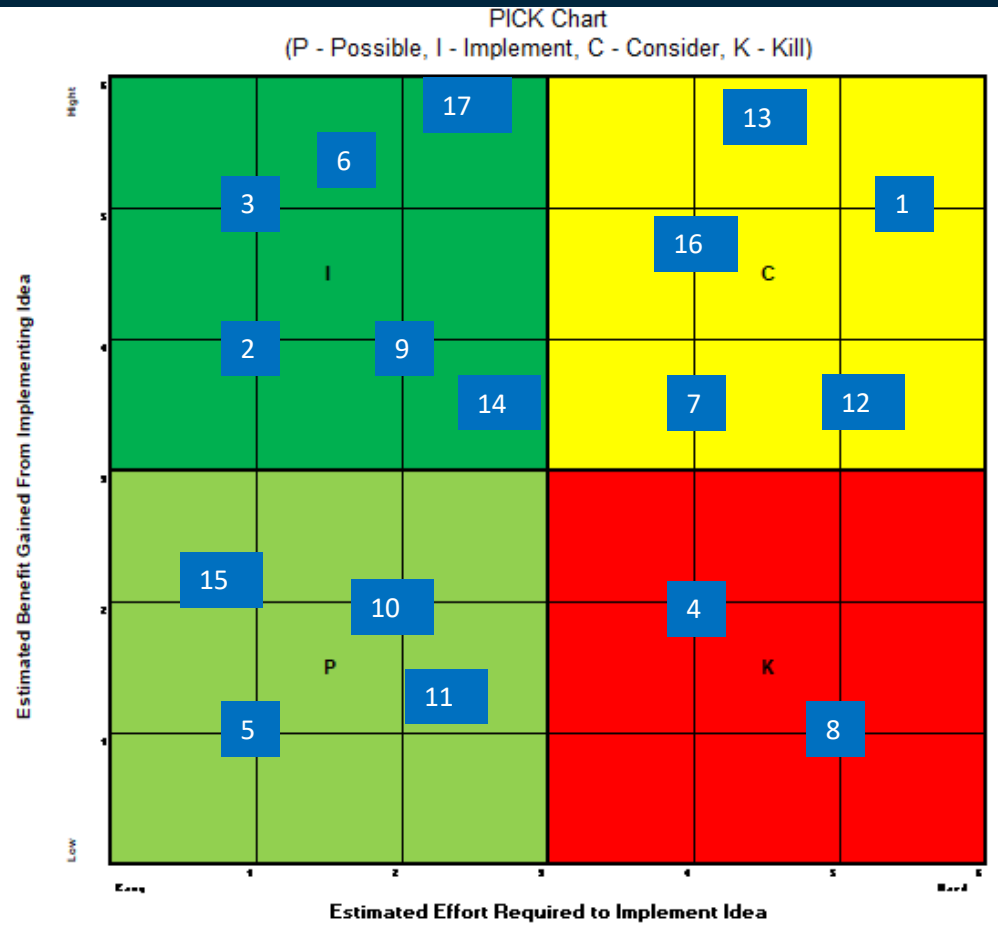


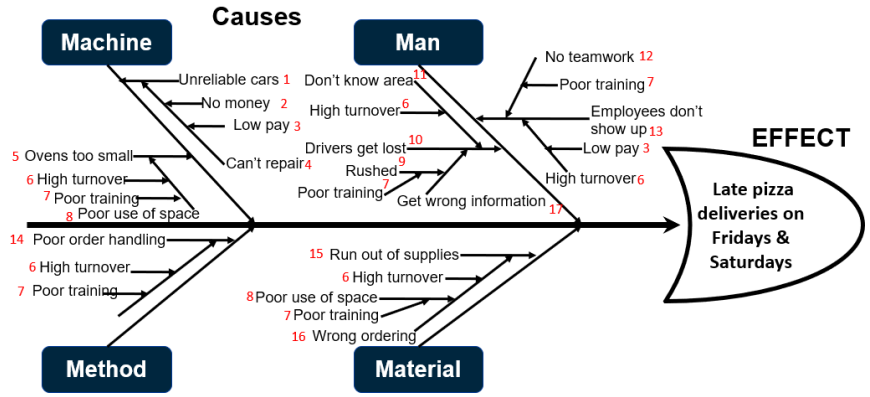
Fishbone to PICK Chart

- P-Possible
- I-Implement
- C-Consider
- K-Kill

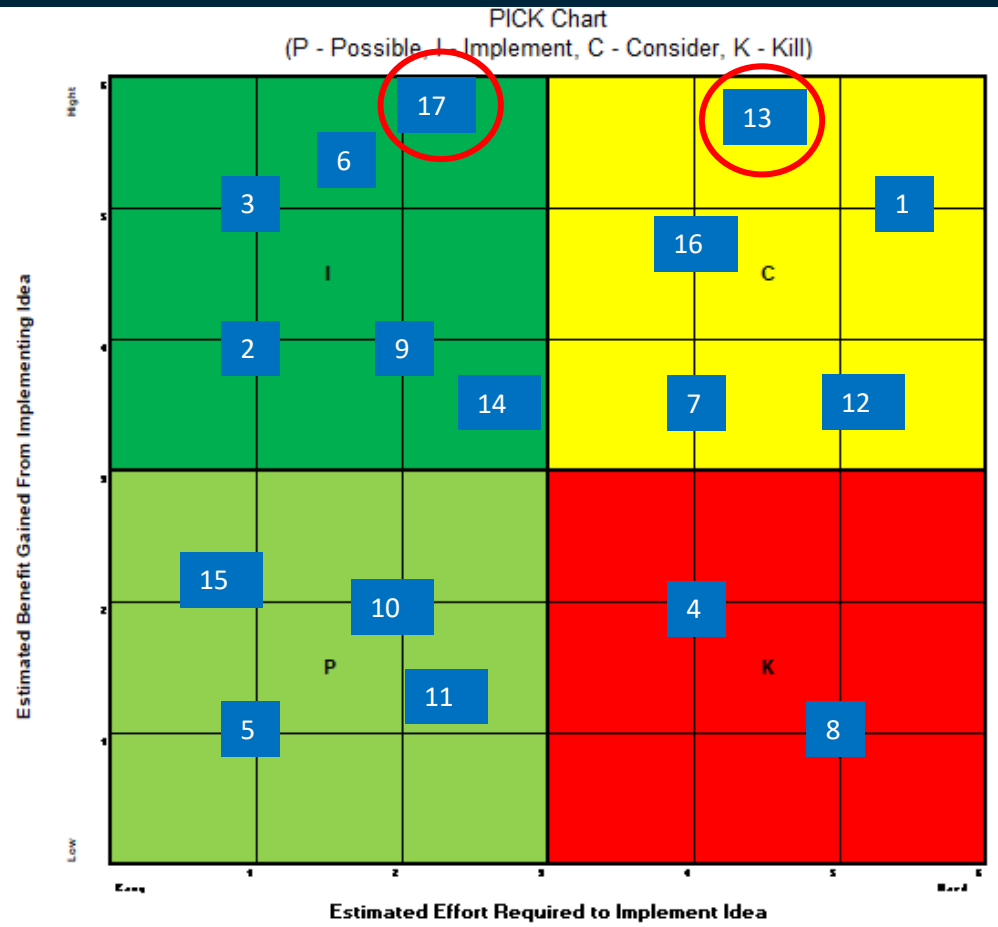


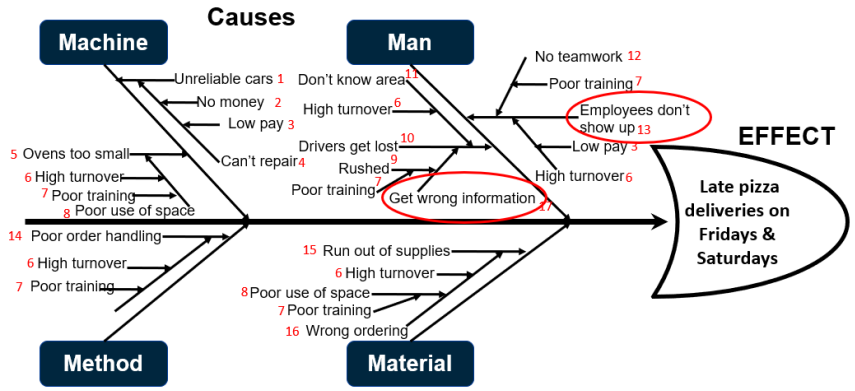
Fishbone to PICK Chart





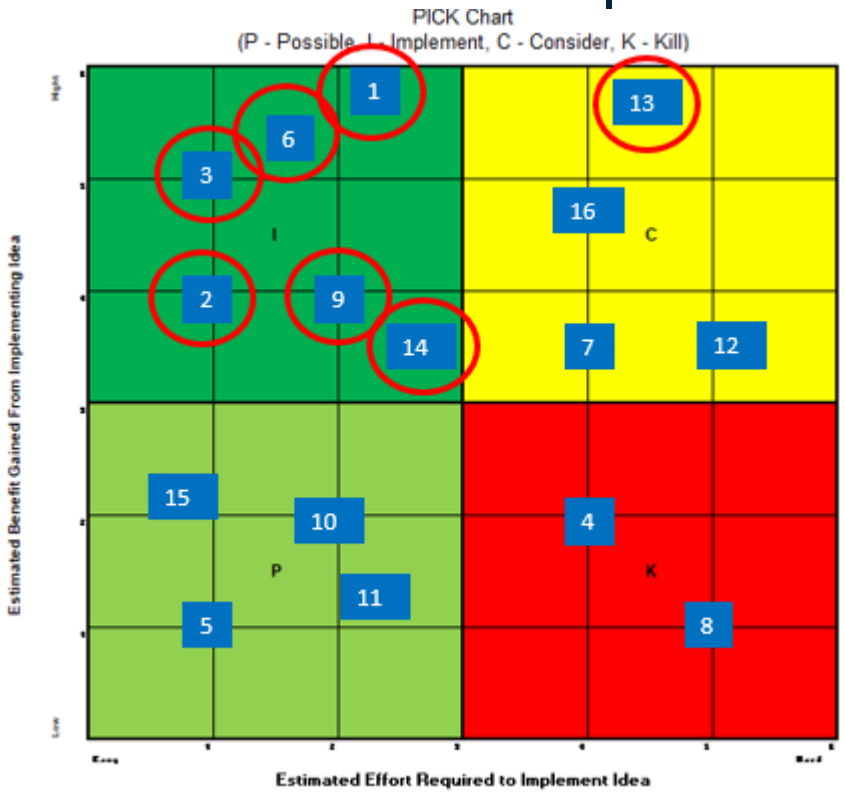
ID Root Causes on PICK Chart



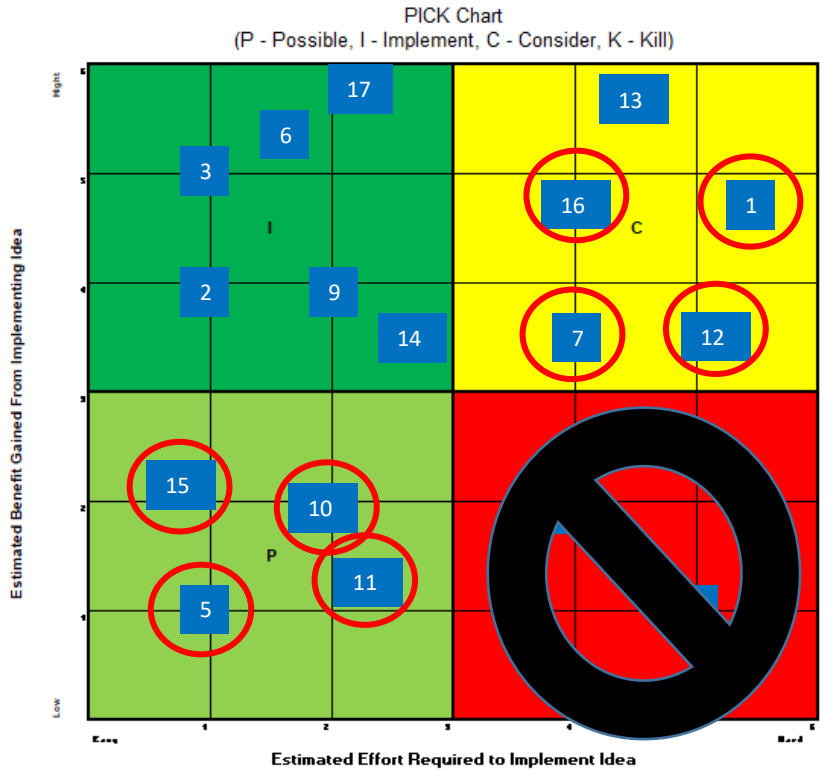


Countermeasures

- Countermeasure should directly attack root cause(s)
- Countermeasures should address “Implement” from PICK chart



Maybe You Can do “Consider” and “Possible”



Countermeasures

- Actions that will be taken to attack the root cause of the problem
- Common mistakes:
  - Jumping straight to solutions BEFORE really understanding the problem
    "I already know how to solve the problem…"
  - Countermeasures that only affect symptoms and not root cause
  - List of countermeasure without actually completing countermeasures
  - Project dies before reaching goal
  - Assigning countermeasures to a team and not an individual

5-Why Analysis

- It peels away the many layers of a problem revealing the symptoms, which often leads to the root cause of a problem.

- Fixing the root cause of a problem is typically more cost effective & less expensive than fixing the symptoms!

Benefits of 5-Whys

- Helps to identify the root cause of a problem
- Is instrumental in determining relationships & distinguishing between multiple causes
- A simple & effective tool that can be used by all
- Flexible enough to be used in a multitude of day-to-day business applications

The 5-Why Process

- Select what is the most likely potential cause from the Cause & Effect diagram
- Ask the question “Why” and Answer it!
- Continue asking “Why” until you believe your answers have reached the Root Cause (usually 5 times)
- Test the logic of your 5 Whys Results & Root Cause by stating “therefore” in reverse order

A-3

- 1-page document that captures all 7 steps of the problem solving process
- Allows the project facilitator a guide to keep the project on track
- Used to capture team roles and responsibilities, action plan, baseline performance, project goal, schedule for updates, etc.
- *5 questions every A-3 should answer*:
  1. What problem are you trying to solve?
  2. How do you know it is a problem?
  3. What is the problem costing you or what is the cost to fix it?
  4. How will you measure success?
  5. What are you going to do to fix the problem?

STEP 1: PROJECT THEME

Problem Statement:

Standard:

Current State:

Gap:

Goal:

Scope:

Background:

STEP 2: GRASP THE SITUATION

Data Collection / Analysis Opportunities:

Project Sponsor:
Team Leader:
Team Facilitator:
Team Members:

STEP 2: GRASP THE SITUATION (CONT'D)

Opportunities Identified:

Root Cause Statement:

STEP 3: PLAN

Plan of Action Statement:

#	Measure	Baseline	Goal	Benefits
1				
2				
3				
4				
5				

STEP 4: DO

	In Planning		On Track
	Off Track		Completed

#	Countermeasure	Status	Owner	Date
1				
2				
3				
4				
5				
6				
7				

Team Name:

Date:

STEP 4: DO (CONT'D)

#	Countermeasure	Status	Owner	Date
8				
9				
10				
11				

STEP 5: CHECK

	Goal Achieved (> 98%)		Approaching Goal (75% to 97%)		Goal Not Achieved (<75%)

#	Measure	Baseline	Goal	30	60	90	Status
1							
2							
3							
4							
5							

STEP 6: ACT

STEP 7: LESSONS LEARNED

nevell group inc.

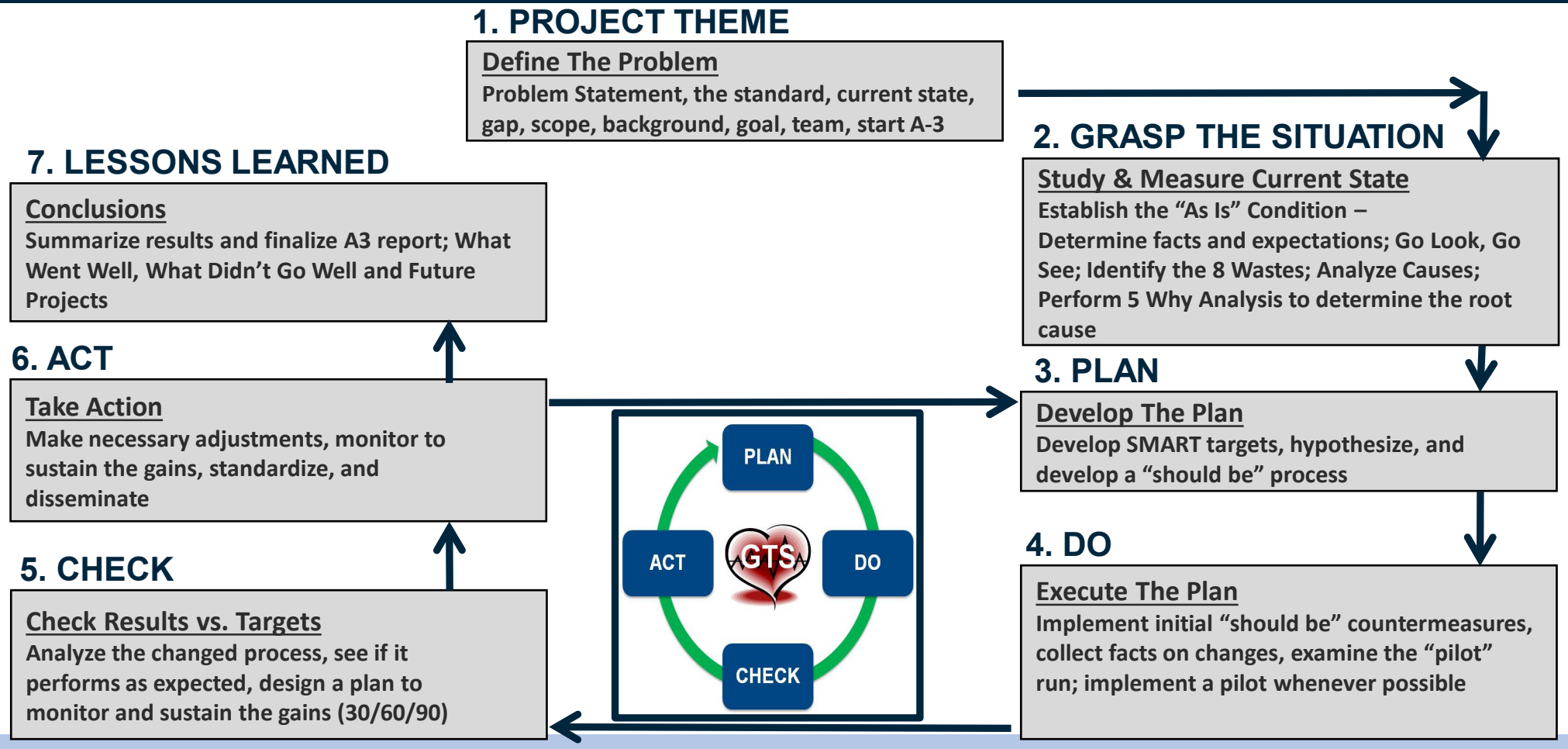
Wow…That's A Lot!

- There are lots of tools that can be used for problem solving
- Just like any good carpenter, use the right tool for the job
- Do not use a sledge hammer to put in thumb tacks
- YOU DO NOT HAVE TO USE THESE TOOLS FOR ALL PROBLEMS
  - If there is a snake in your yard, you do not have to analyze its life history, just cut off his head!
  - However if another snake shows up, go find where they are coming from
- The 7-step problem solving process (and the tools) can be used with any size problem and will help attack the root cause

Key to Problem Solving

- Innovative
- Dynamic
- Aggressive

7-Step Problem Solving Method



Problem Solving Simulation

Basics of the Game

- Objective: Construct a 13-story building in under 60 seconds with 1 or less defects
- The four suits represent the specific trades
  - Spades = Framers (first step)
  - Hearts = Hangers (second step)
  - Clubs = Tapers (third step)
  - Diamonds = Painters (fourth step)
- Each “floor” (row of cards) of the building is represented by the face value of the card (ace = first floor, 2 = second floor, etc. with the king = 13th floor)

Basics of the Game (cont'd)

- Each table needs a dealer, scribe, time-keeper, inspector, and 4 builders
- Dealer will shuffle cards and each group will receive a stack of 13 random cards
- Instructor will start the game, time-keeper will keep the time for each table, inspector will call out defects, and scribe track the data
- The first card that must be played is the Ace of Spades (first trade on the first floor), the last card that must be played is the King of Diamonds (last trade on the last floor)

Basics of the Game (cont'd)

- Cards are placed from lowest (Ace) to highest (King) according to their suit
- ♠ Framers cards may be placed independently of other suits, but must be placed in sequence from Ace (low) through King (high)
- ♥ Hangers cards must also be placed in Ace-King sequence and are only placed AFTER the framer card on any given floor
- ♣ Tapers cards must also be placed in Ace-King sequence and are only placed AFTER both the framer and hanger cards are placed for any given floor
- ♦ Painters cards must also be placed in Ace-King sequence and are only placed AFTER the framer, hanger, AND taper cards are placed for any given floor

Sequence Example

First card always has to be A♠ no other trades can build until framing is done. Once that is in place, framer can move to second floor 2♠ or the hanger can work on first floor A♥

A♠	A♥	A♣	A♦
2♠	2♥	2♣	2♦
3♠	3♥	3♣	3♦
4♠			
5♠			
7♠			

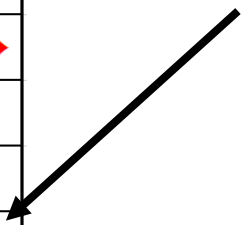
Defect! The painter cannot work before the taper is done

Defect! Cannot start the 7th floor until the 6th floor is done

End of Game

A♠	A♥	A♣	A♦
2♠	2♥	2♣	2♦
3♠	3♥	3♣	3♦
4♠	4♥	4♣	4♦
5♠	5♥	5♣	5♦
6♠	6♥	6♣	6♦
7♠	7♥	7♣	7♦
8♠	8♥	8♣	8♦
9♠	9♥	9♣	9♦
10♠	10♥	10♣	10♦
J♠	J♥	J♣	J♦
Q♠	Q♥	Q♣	Q♦
K♠	K♥	K♣	K♦

Time stops when last card is played



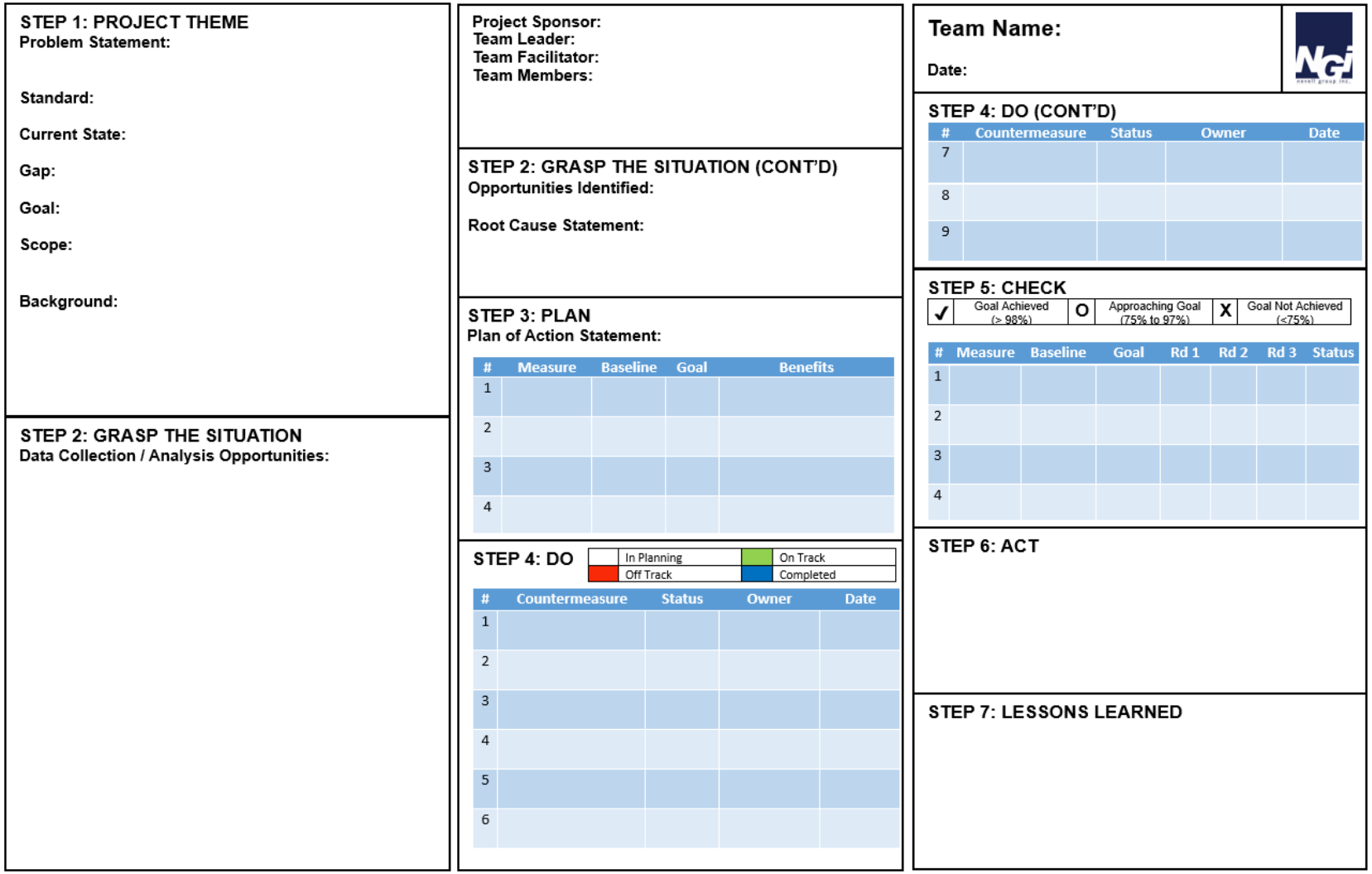
Rounds

- **You are not allowed to talk to each other or collaborate**
- Build as fast as you can following all of the game rules
- Instructor will start game, inspector will call out all defects, timer will stop clock after last card is played, and scribe will write down total time and defects
- After Round - If you did not hit the goals (under 60 seconds and 1 defect) utilize A-3 to problem solve
  - Remember to define problem, current state, standard, gap, and goal
  - Complete steps 1-4 (Problem, GTS, Plan, Do) of the 7-step problem solving process
  - Implement countermeasures and run through again
  - Capture new results on step 5 (Check)
  - If you did not hit your goal, do step 6 (Act) and run again. Repeat until goal is achieved and then move to step 7 (Lesson Learned)

Questions

- Remember…
- The four suits represent the specific trades
  - Spades = Framers (first step)
  - Hearts = Hangers (second step)
  - Clubs = Tapers (third step)
  - Diamonds = Painters (fourth step)

Handout #1 for Problem Solving Simulation



STEP 1: PROJECT THEME
Problem Statement:

Standard:

Current State:

Gap:

Goal:

Scope:

Background:

STEP 2: GRASP THE SITUATION
Data Collection / Analysis Opportunities:

Project Sponsor:
Team Leader:
Team Facilitator:
Team Members:

STEP 2: GRASP THE SITUATION (CONT'D)
Opportunities Identified:

Root Cause Statement:

STEP 3: PLAN
Plan of Action Statement:

#	Measure	Baseline	Goal	Benefits
1				
2				
3				
4				

STEP 4: DO

	In Planning		On Track
	Off Track		Completed

#	Countermeasure	Status	Owner	Date
1				
2				
3				
4				
5				
6				

Team Name:

Date:

STEP 4: DO (CONT'D)

#	Countermeasure	Status	Owner	Date
7				
8				
9				

STEP 5: CHECK

✓	Goal Achieved (> 98%)	O	Approaching Goal (75% to 97%)	X	Goal Not Achieved (<75%)		

#	Measure	Baseline	Goal	Rd 1	Rd 2	Rd 3	Status
1							
2							
3							
4							

STEP 6: ACT

STEP 7: LESSONS LEARNED

Handout #2 for Problem Solving Simulation

	Total Time	# of Defects
Round 1		
Round 2		
Round 3		

Questions

?