Problem Solving
and
Decision Making

PROBLEM SOLVING AND DECISION MAKING

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What do we know already?

"We can't solve problems by using the same kind of thinking we used when we created them."

Albert Einstein

"If you don't have time to do it right, when will you have time to do it over again?"

John Wooden

Introduction

Benefits of Structured Problem Solving Process

❖ Reduce / eliminate time lost in debate
❖ Identify weak points in the processes
❖ Discover systemic causes
❖ Explain with reasons why an incident occurred
❖ Gives a factual representation of the incident
❖ Compare what actually happened against what should have happened, at any point during the incident

> *Standard (Structured) Problem Solving to ensure …*
>
> *… problems don't reoccur.*

Introduction

Types of Problem Solving Methods

1. Just Do It!

2. DMAIC (Define, Measure, Analysis, Improve, Control)

3. 8 Disciplines

4. (multiple other methods, and variations of these/others)

<u>Problem Solving Methods</u>

Just Do It:

❖ This method is used for very simple, straight-forward problems, or when adequate time is not available. *Caution – if the "root cause" is not clearly known, there is a risk of not solving the problem.*

❖ In the event sufficient time is not available, this method requires the team consist of subject-matter-experts to solve the problem.

❖ And, this method still requires the responsible person / owner to monitor and assure the issue never returns.

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Problem Solving Methods

DMAIC (Define, Measure, Analysis, Improve, Control):

Six Sigma – Improvement Focus

Define	Measure	Analyze	Improve	Control
Focus	Focus	Focus	Focus	Focus
What is the full scope of the problem?	What are we doing, and how well are we doing it?	Review the data. Then, what is the root cause?	Get from the problem statement to the goal statement.	Sustain the gain!

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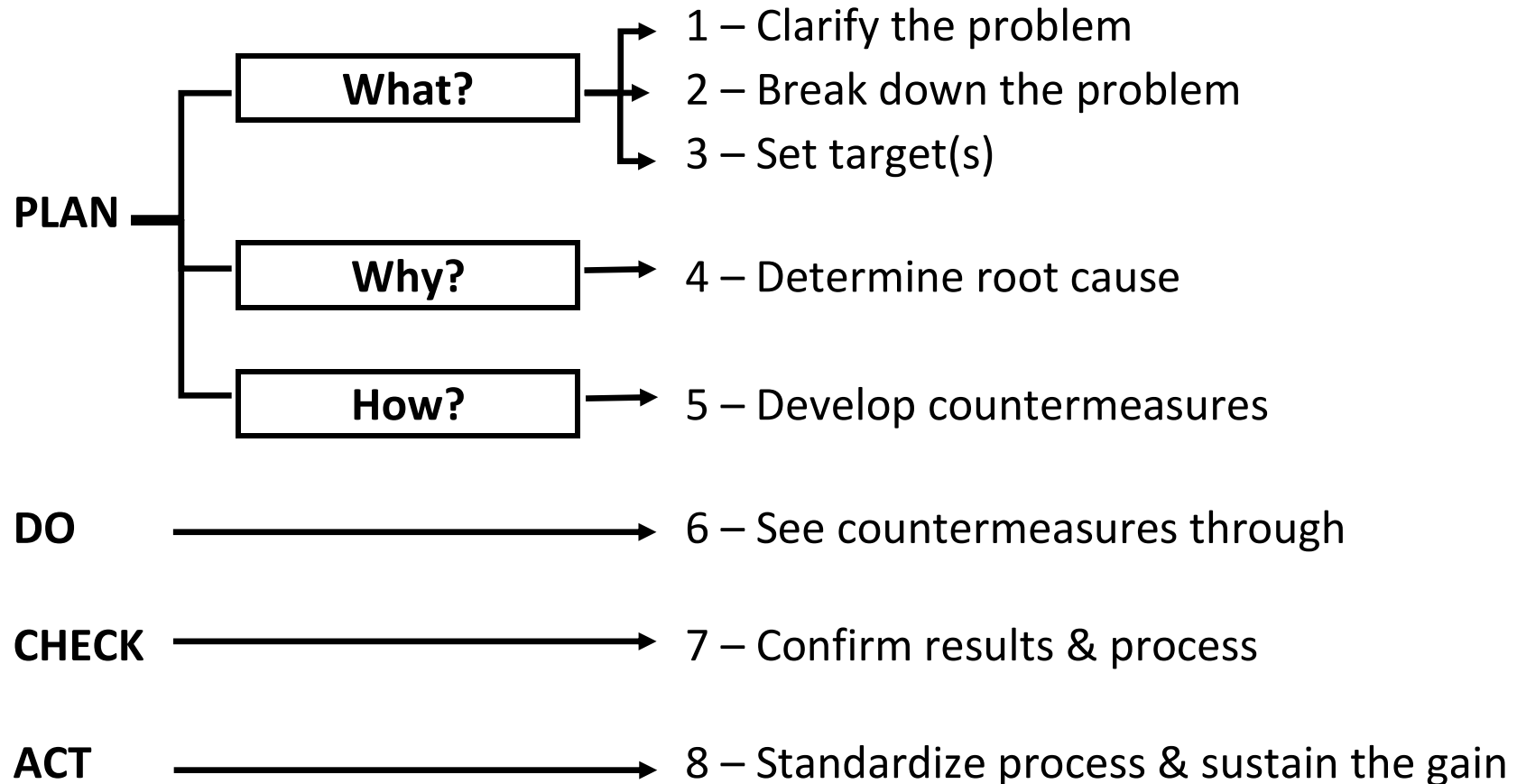
Problem Solving Methods

8-D, or 8 Disciplines (8 step problem solving – data driven tool):

1. Establish team & plan *(remember team development)*
2. Describe / define the problem
3. Develop an interim containment action *(usually manual)*
4. Define & verify root cause
5. Choose & verify permanent corrective action
6. Implement & validate permanent corrective action
7. Prevent recurrence – sustain with standardized solution, e.g., SOP
8. Recognize the team – celebrate!
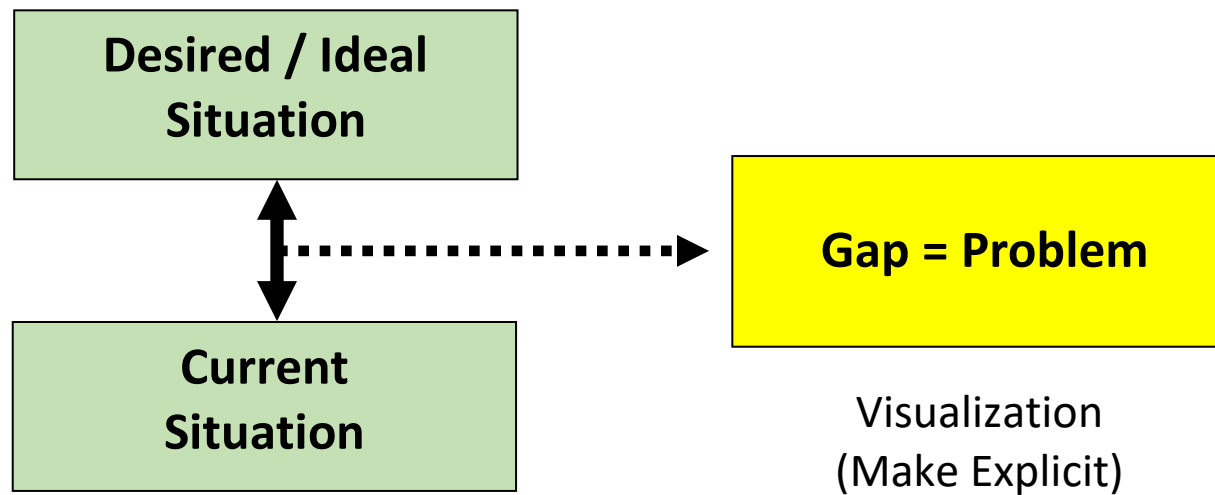
Used for major impact or repetitive issues

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PROBLEM SOLVING

Fit Detail with PDCA?

PLAN

What? → 1 – Clarify the problem
→ 2 – Break down the problem
→ 3 – Set target(s)

Why? → 4 – Determine root cause

How? → 5 – Develop countermeasures

DO → 6 – See countermeasures through

CHECK → 7 – Confirm results & process

ACT → 8 – Standardize process & sustain the gain

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Step 1: Clarify the Problem

Desired / Ideal Situation

↕ ┈┈┈┈┈┈┈┈┈▶ | **Gap = Problem** |

| Current Situation |
| --- |

Visualization
(Make Explicit)

❖ Team needs to understand the 'Current Situation' (Measured) and the 'Ideal Situation' (Standard)

❖ Why is it a problem? What KPI (key performance index) is affected? What is the cost? Relation to Objective? Why is it a priority?
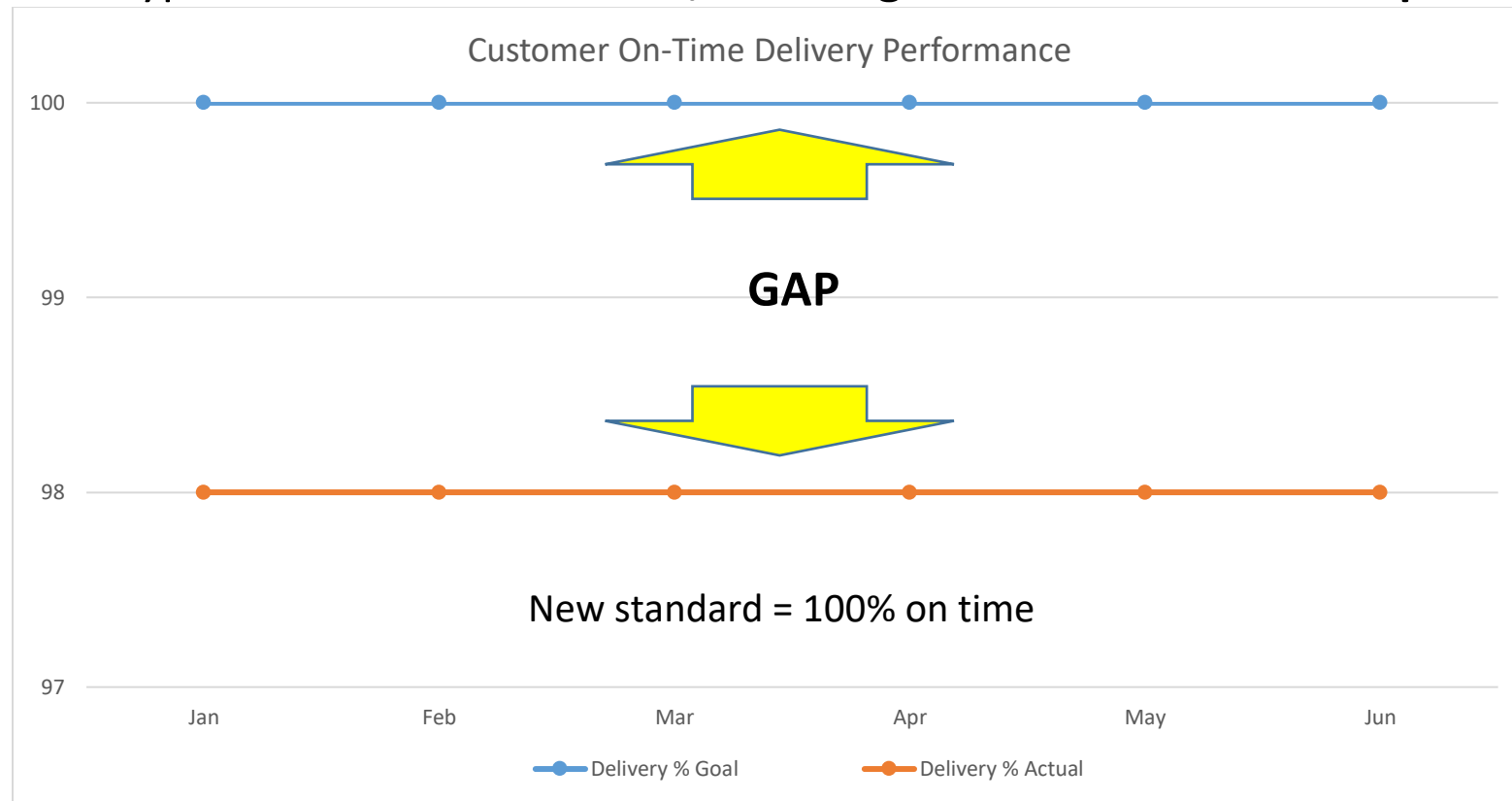
Step 1: Clarify the Problem

Problem type 1: **Standard not achieved**

Customer On-Time Delivery Performance

GAP

Delivery % Goal   Delivery % Actual
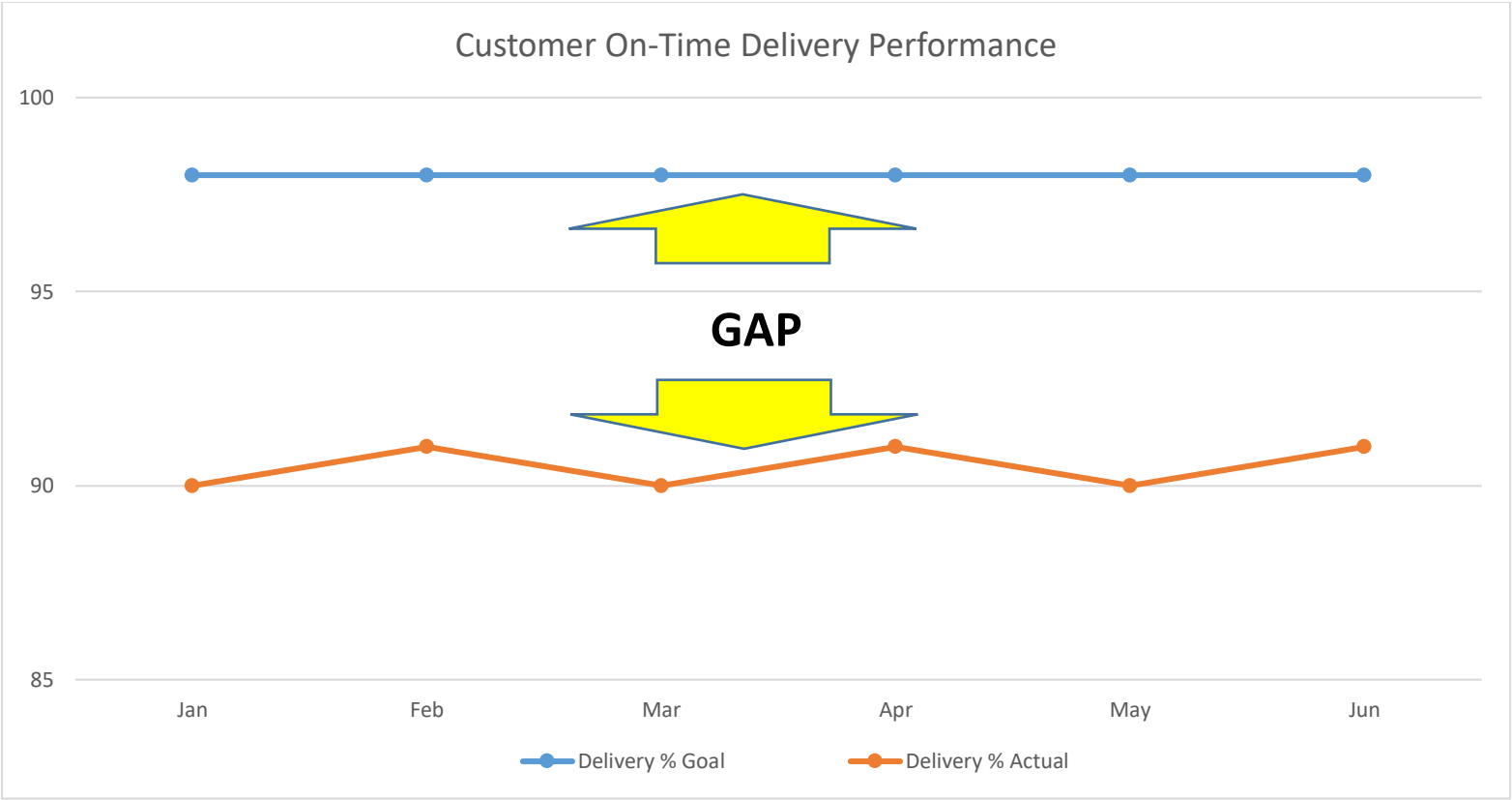
Step 1: Clarify the Problem

Problem type 2: **Standard achieved, but a higher standard is now required**

Customer On-Time Delivery Performance

GAP

New standard = 100% on time

Jan	Feb	Mar	Apr	May	Jun

— Delivery % Goal   — Delivery % Actual

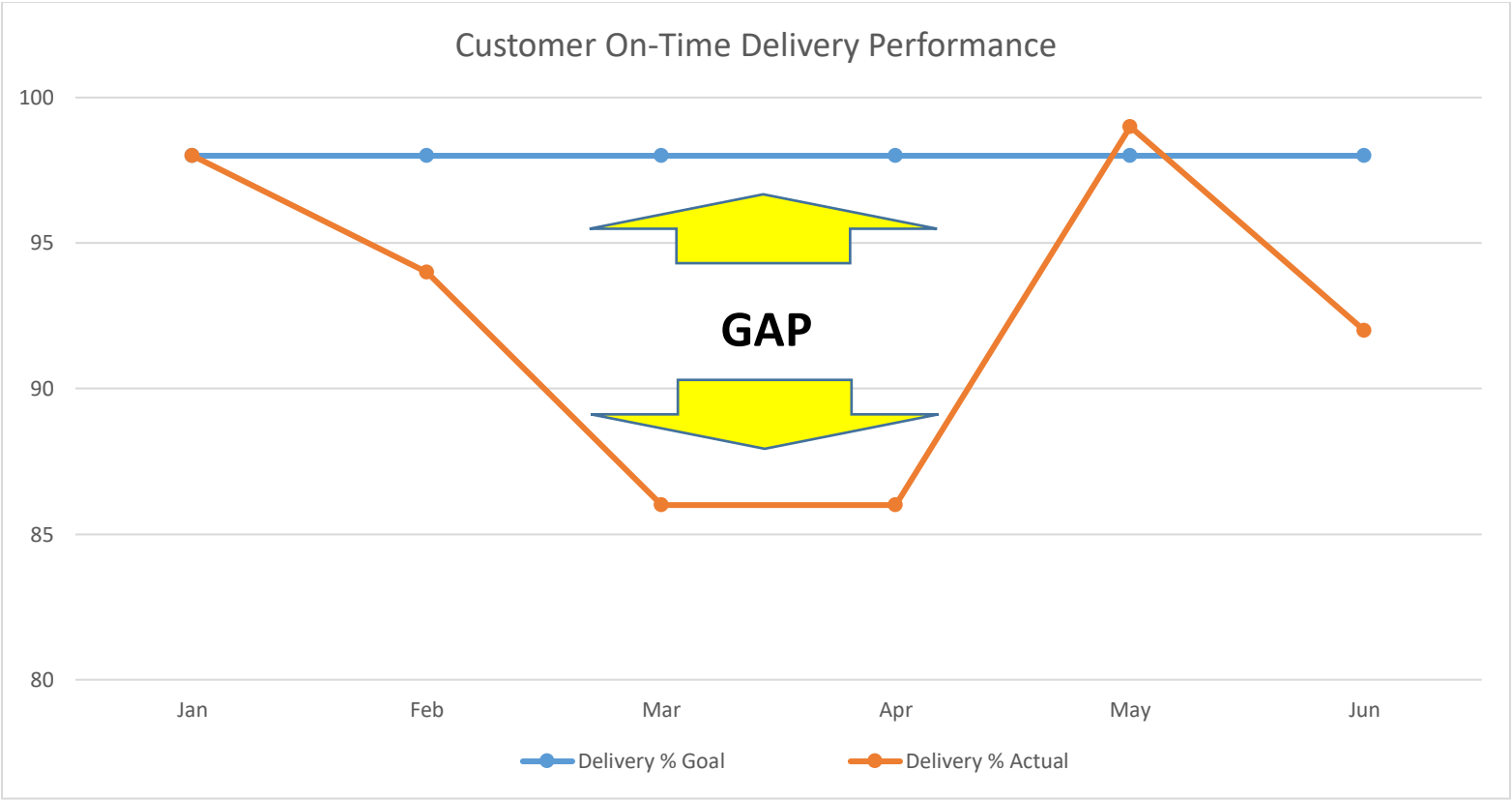*"Excellence with Integrity"*

Step 1: Clarify the Problem

Problem type 3: **Performance to standard varies (not consistently achieved)**

Customer On-Time Delivery Performance

GAP

Jan   Feb   Mar   Apr   May   Jun

Delivery % Goal   Delivery % Actual

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Step 2: Break Down the Problem

❖   Requires studying the process in detail

❖   Dedicate sufficient time for the breakdown / analysis

❖   Study the steps of the process, interact with people, get data, documents, understand tools – **learn**

❖   All problems can be divided into smaller defined problems: by region, location, department, product, channel, customers, etc.

❖   Specify the point of cause: the problem is present in a specific part of the process - - - point of cause is necessary for effective root cause analysis

Step 3: Target Setting

TARGET

What?   How much?   By when?

Output / Deliverable To Be Achieved
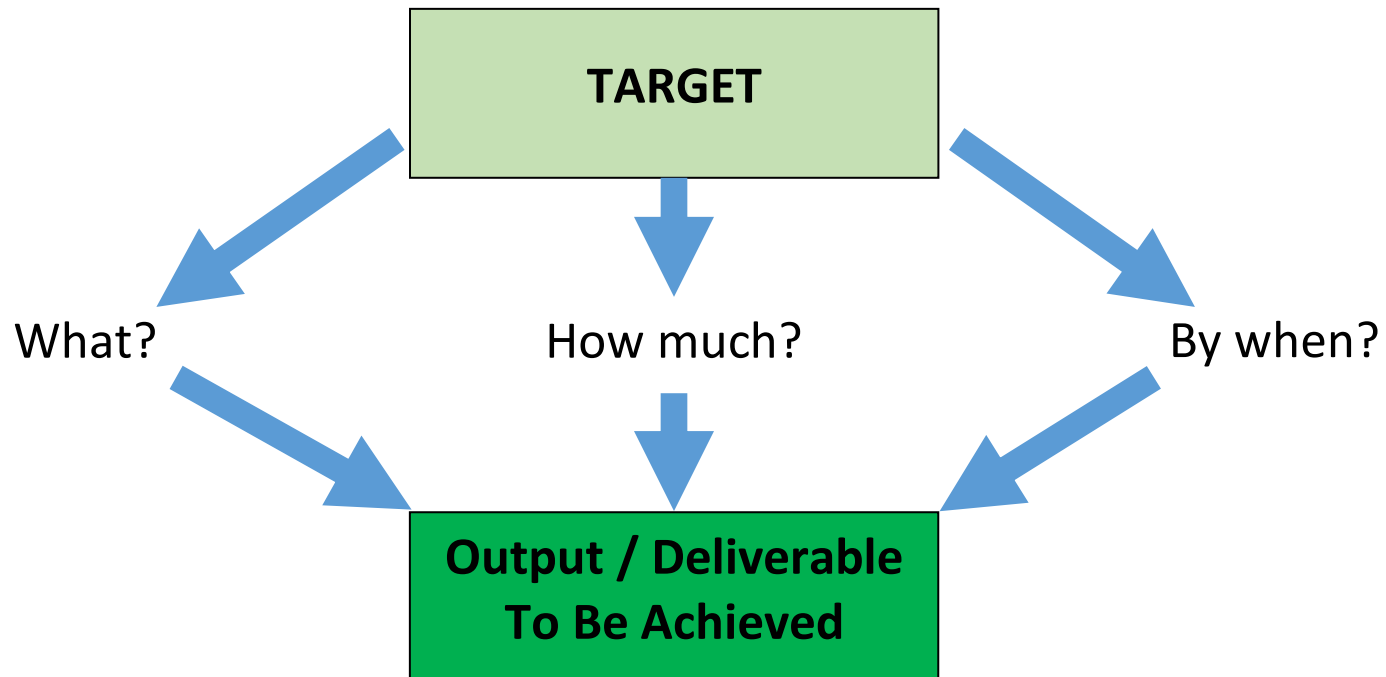
Targets are a tool to stimulate (drive) improvement

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Step 3: Target Setting

Are the below targets GOOD or BAD?

B – We will improve the way we handle complaints.

B – We will reduce the number of complaints by 10% by next fiscal year end

G – We will increase our delivery performance from 90% to 98% by the end of the third quarter of this fiscal year

B – We will increase our sales next year

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Step 4: Determine the Root Cause

Why Root Cause Analysis?

❖ To solve problems in a structured manner

❖ To ensure problems do not return / are permanently solved

❖ To ensure sustainable improvements are made

Fixing symptoms will <u>not</u> solve the problem!

<u>Tools Used in Problem Solving</u>

❖ Cross-functional teamwork

❖ Brainstorming

- No judgement or criticism *(often, even what might seem like a bad suggestion triggers thoughts toward good suggestions)*
- Quantity over quality --- Quality implies judgement *(there will be time to determine which are the quality suggestions)*
- Freewheel --- Do not get trapped by your own train of thinking *(paradigms)*
- Mutate and combine --- Keep using previous ideas as stimuli for new ideas

Tools Used in Problem Solving *(cont'd)*

❖ 5 Why's (for root cause analysis, not to solve the problem)

        Example Problem: My car won't start.

    1. *Why?* … The battery is dead.
    2. *Why?* … The alternator is not functioning.
    3. *Why?* … The alternator belt has broken.
    4. *Why?* … The alternator belt was beyond its useful service life and has never been replaced.
    5. *Why?* … I have not been maintaining my car according to the recommended service schedule.

        (The last "why" should be the root cause – it's not always "5", it may be more, or less)

Tools Used in Problem Solving *(cont'd)*

❖ Exactly 5 Why's?
- ◆ You may find yourself using 3 to 7 "Why's" or more on a problem
- ◆ "Strive for 5" Why's – in other words, don't quit too early!
- ◆ Use as many as you NEED to get to an <u>ACTIONABLE</u> root cause
- ◆ Base "Why's" on facts and observations, not opinions

❖ Test your "Why" logic by using "Therefore" in reverse

> *Make the tools work for you, don't be a slave to the tools*

Tools Used in Problem Solving *(cont'd)*

❖ Pareto Analysis
  ◆ Universal principle, called the "vital few versus trivial many"
  ◆ Pareto's Principle or the '80/20 Rule' --- 20 percent of something are responsible for 80 percent of the results
    – *20% of input creates 80% of the result*
    – *20% of the customers create 80% of the revenue*
    – *20% of the errors cause 80% of the costs*
    – *Etc.*

Tools Used in Problem Solving *(cont'd)*

❖ Fishbone Diagram – Cause & Effect Diagrams
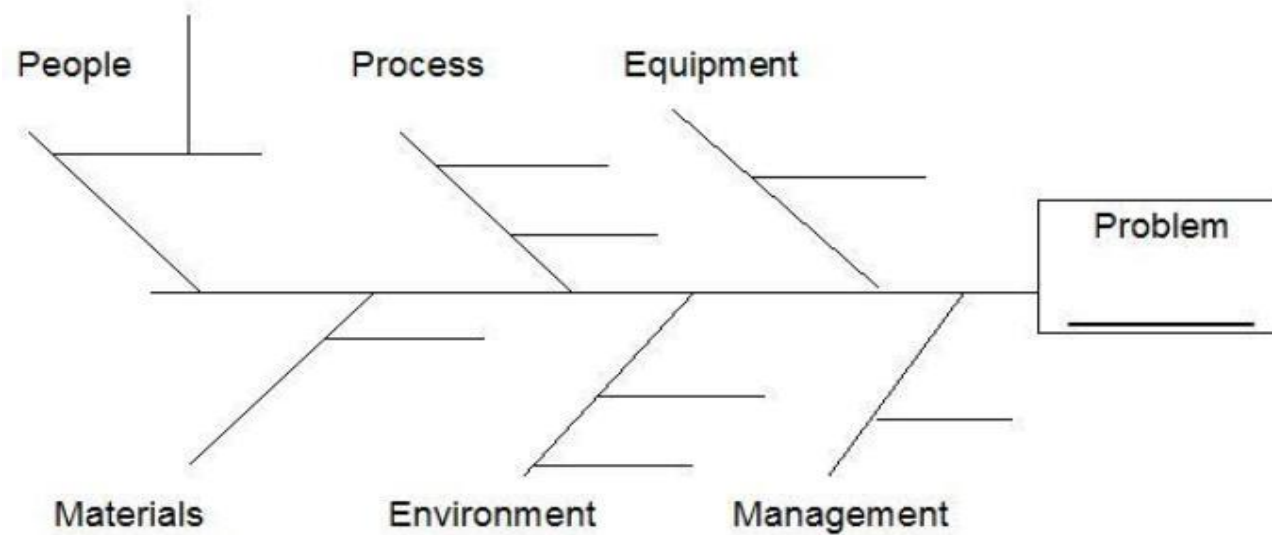
Step 5: Develop Countermeasures

❖ Consider: How to eliminate the root cause

❖ Use creativity techniques to generate large number of ideas:

Brainstorming	**Brain-writing**
All participants present their ideas, and the idea collector records them	*All participants collect ideas & write their ideas on a note (approximately 3 ideas, in 5 minutes), and then, repeat this process 5 times*
➢ *Focus on quantity* ➢ *Unusual ideas are welcome*	

Start without any evaluation of the ideas!

Step 5: Develop Countermeasures

Psychology of countermeasures

Good problem solving and countermeasure preparation will drive an organization to:

    a) Productive self-criticism

    b) More robust systems and processes

    c) A higher-level understanding

The countermeasure cycle is a team effort!

Effective Problem Solving with robust countermeasures lead to better processes!

Step 6: See Countermeasures through

❖   Share information with others by informing, reporting and consulting

❖   Review the progress of the action plan and the results in regular review meeting

❖   Ensure countermeasures do not create adverse effect to other upstream or downstream processes – *think in non-linear, not linear terms*

Step 7: Confirm Results & Processes

❖   Evaluate and determine if target was achieved or not

❖   Evaluate the process and ensure it is sustainable

❖   Confirm negative and positive effects
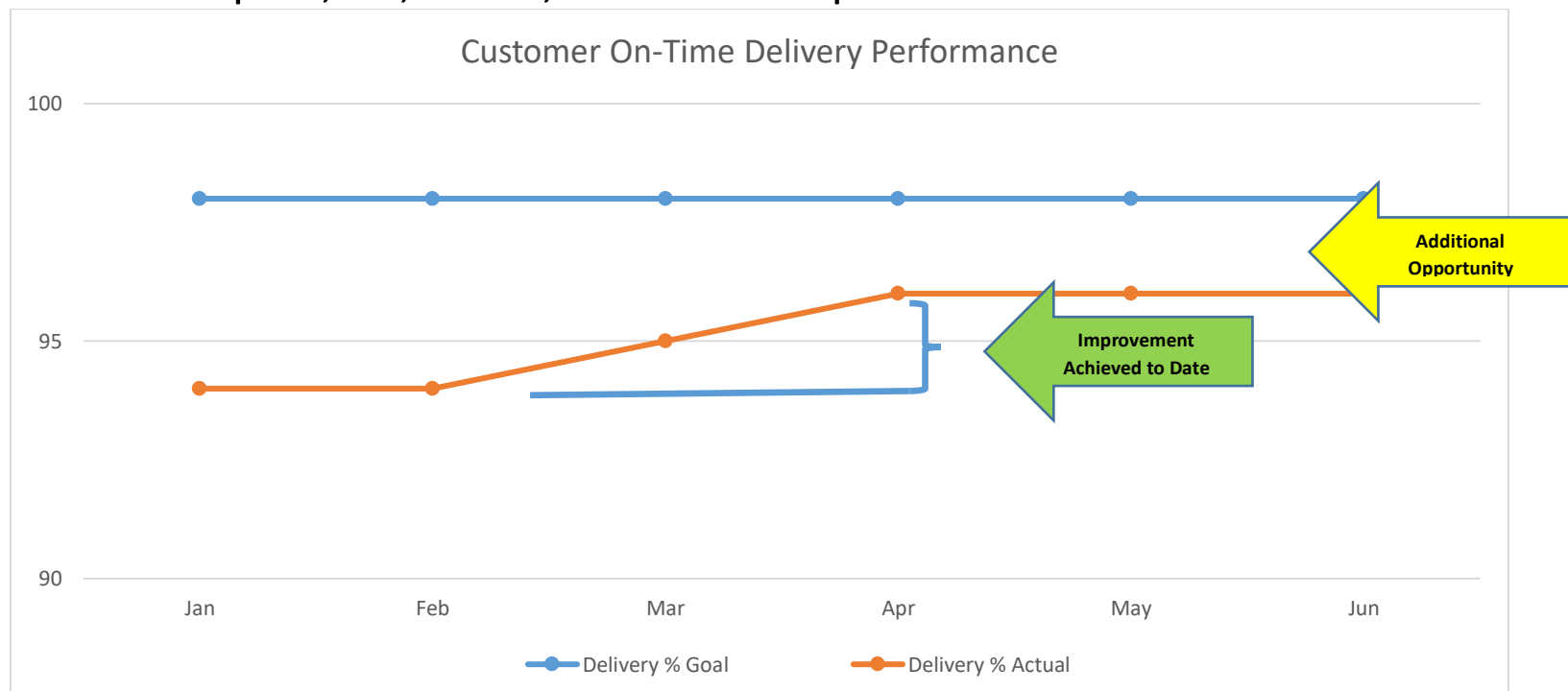
❖   Share evaluation with people involved

Step 8: Standardize process

❖ Set successful processes as new standard

❖ Share the new standard
Standardization examples:
- ◆ Checklists
- ◆ Flow-charts
- ◆ Standard work charts
- ◆ SOP's
- ◆ Manuals

PROBLEM SOLVING

Step 8: Standardize process

❖   Start the next round of improvements – improve upon improvements

❖   PDCA – plan, do, check, act – then repeat

Customer On-Time Delivery Performance

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Example of synergies between tools

Team Work
- ❖ Ensure that a team is gathered to discuss the problem
- ❖ Cross-functional team sparks creativity & "out-of-the-box" thinking

Brainstorm
- ❖ Brainstorming can be used for 5-Whys's as well as Cause & Effect diagram as method for obtaining ideas on causes

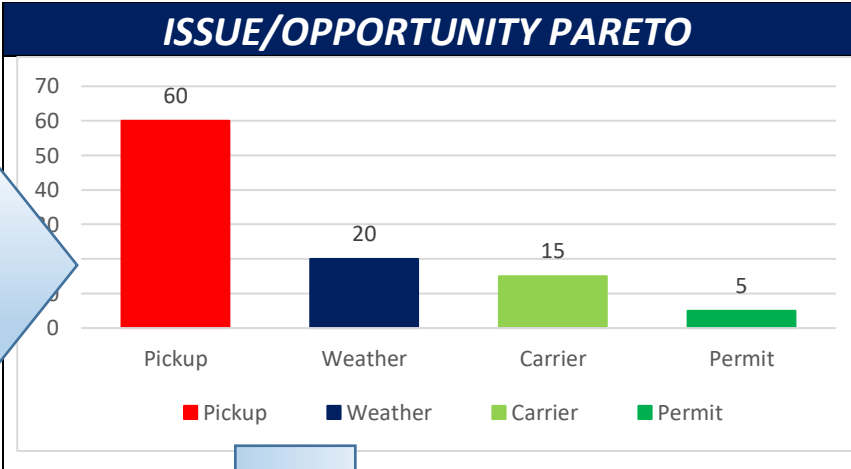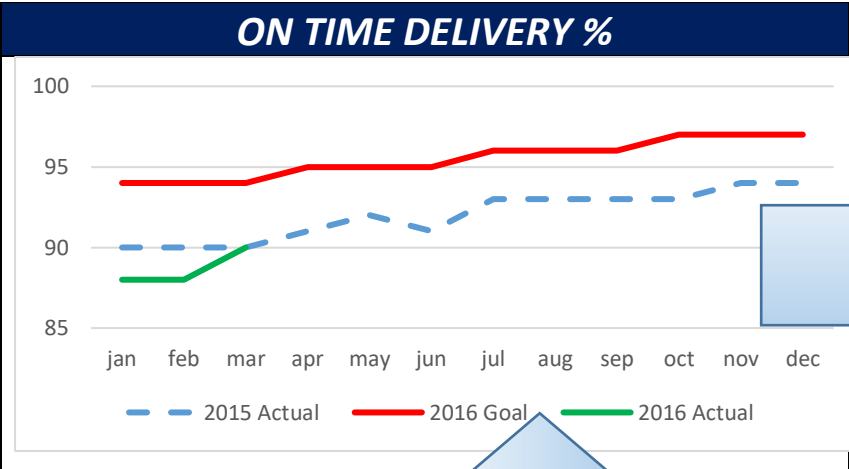**Fishbone Diagram** (also known as cause & effect)
- ❖ The fishbone diagram helps explore all potential and/or real causes that result in a single defect or failure
- ❖ Once inputs are established on the fishbone, you can use the 5-Why's technique to further drill down to the root causes

5-Why's
- ❖ The 5-Why's can be used individually or as a part of the fishbone diagram

PROBLEM SOLVING

Example: Continuous Improvement System (CIS) Model

ON TIME DELIVERY %

Legend: 2015 Actual (dashed blue), 2016 Goal (red), 2016 Actual (green)

ISSUE/OPPORTUNITY PARETO

	Pickup	Weather	Carrier	Permit
Value	60	20	15	5

PARETO ITEM	CAUSE	IMPACT	ACTION(S)	PREDICTION	OWNER	TIMING
Pick Up late	1. 2.	60%	1. 2.			
Weather		20%				
Carrier		15%				
Permit		5%				

REMEMBER…

"We can't solve problems by using the same kind of thinking we used when we created them."

"If you don't have time to do it right … when will you have time to do it over again?"

"LEAN THINKING"

❖ Fundamental Objective: To create the most value while consuming the fewest resources.

❖ Define value from the customer's perspective.

❖ Identify which process steps create value and which are only waste.

❖ Work to eliminate the root cause of the waste and allow for continuous improvement.

DECISION MAKING

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The Five Levels of Decision Making

Note that with each level the amount of time and the level of involvement increases.

Level One (L-1): Leader makes the decision alone & announces

This level can take little time and requires no involvement. This is used especially in emergency situations where immediate action is critical. Input is not helpful, quick action and immediate compliance is what counts. Unfortunately, some leaders use this level when there isn't an emergency and more time could be taken to involve others by using another Decision Making Level.

Level Two (L-2): Leader gathers input from individuals and decides

The leader seeks input, usually to cover blind spots and enhance their depth of understanding around the issue to be decided. Key individuals hold important information and not consulting them would be a mistake.

The Five Levels of Decision Making *(cont'd)*

Level Three (L-3): Leader gathers input from team and decides

    Leader holds a team meeting and solicits input from the team, listens to the team's ideas, and then takes that information and decides.

Level Four (L-4): Consensus building

    At this level the leader is part of the team and he/she is just one vote/voice among many. The group processes all the decisions involved, compromises positions until everyone is in agreement. Consensus is reached when everyone feels at least comfortable with the decision, feels like their thoughts and opinions have been heard, and everyone agrees to stand behind the decision.

The Five Levels of Decision Making *(cont'd)*

Level Five (L-5): Consensus and delegates with criteria/constraints
> Leader fully delegates the decision to the team and is not a part of the decision making discussions. This level requires the leader to be very clear with the team as to what criteria/constraints must be met for their decision to be able to move forward! Failure to meet that criteria could result in the team being sent back to the drawing board, or the leader choosing a "fall back option" and utilize another level for moving the decision forward.

What is "fall back option":
> Within the levels of decision making the "fall back option" is used by the leader when the team can't reach consensus and the leader needs to get involved. Leaders must make the team aware of the "fall back option" prior the process. Leaders also need to make sure they don't use it too quickly!

The Five Levels of Decision Making *(cont'd)*

When leaders use "The Five Levels of Decision Making" the following occurs:

1. They start to see and understand one of the many components of effective decision making and the part it plays in their team.

2. Leaders start to see the value of clearly communicating whenever possible with the team what level of decision making they are choosing prior to the decision being made so the team doesn't have unrealistic expectations.

3. Team members start to see the reasons leaders have to choose one level over the other in certain situations, and

4. Leaders begin to assess whether they are relying too much on one level over another, and if they are using the best level for a particular decision.