

Root Cause Analysis

(beyond the 5 why's...)



Introductions

- Facilitators:
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 - Anastasia Hryciw de Reijke, NSF-ISR

- Participants:
 - Name, OA/Municipality, Role regarding DWQMS

Overview

We will cover examples of Root Cause Analysis (beyond the 5 why's) for those new to DWQMS as well as a review for those who may be returning to the workplace with respect to expectations, requirements as well as continually improving using your internal & external corrective actions process knowledge.

Learning Objectives

Participants will have the ability to:

- ✓ Know the various types of Root Cause Analysis (beyond the 5 why's) to prepare for responding to any day-to day operations problems, non-compliance issues & any internal/external DWQMS non-conformances.
- ✓ Plan & prepare effectively & efficiently for internal & external DWQMS Corrective Action Responses.
- ✓ Identify & utilize the required information to respond to non-conformances with respect to the DWQMS standard, policies, procedures & OA/Municipalities' DWQMS: containment plan, Root Cause Analysis, corrective action plan, preventative action plan.

Corrective Action Response

- **Correction (containment) evidence** is one of the most commonly forgotten items when submitting your Corrective Action Response for review.
- **Don't move onto corrective action planning prematurely** before your team agrees the Root Cause has been correctly identified (not the symptoms). If not, possible complete tasks will not fix the problem fully, causing system continued gap risking future non-conformities (NCs) – potential major NCs if the same issue is identified.

Corrective Action Response cont'd

- **Training for process changes related to (NCRs)** is particularly important due to the risk of recurrence & that the team is already settled into doing this incorrectly. Do not create training that only reviews the NC in place of a training of the process that has changed. NC shouldn't be mentioned in the training as **should be built to be longstanding (current & future team members)**.
- Verification of effectiveness (VOE) is critical but often overlooked as part of the overall NCR process. It is done after all implementation items are complete to ensure the implemented corrective actions are working as expected & no adjustments are needed to the plan. **VOE should be done by someone that was NOT the Non-conformance lead.**

Root Cause Analysis

- **Definition of root cause** – The absence of a best practice or the failure to apply knowledge that would have prevented a problem.
- **Identify the cause, not symptoms** – don't stop at the surface, take time to understand the problem & what led to it instead of implementing band aid solutions.
- **Perform analysis** – involve people with different points of views as well as those involved to be open to discussing the situation (problem, finding).
- **Eliminate the problem permanently** – try to avoid fixing an isolated issue, look across other similar processes that could have this issue, fixing it one time fully will be less work in the long run than fixing it multiplies times (i.e., document control could be systemic & not only in the area cited).

Root Cause Analysis_{cont'd}

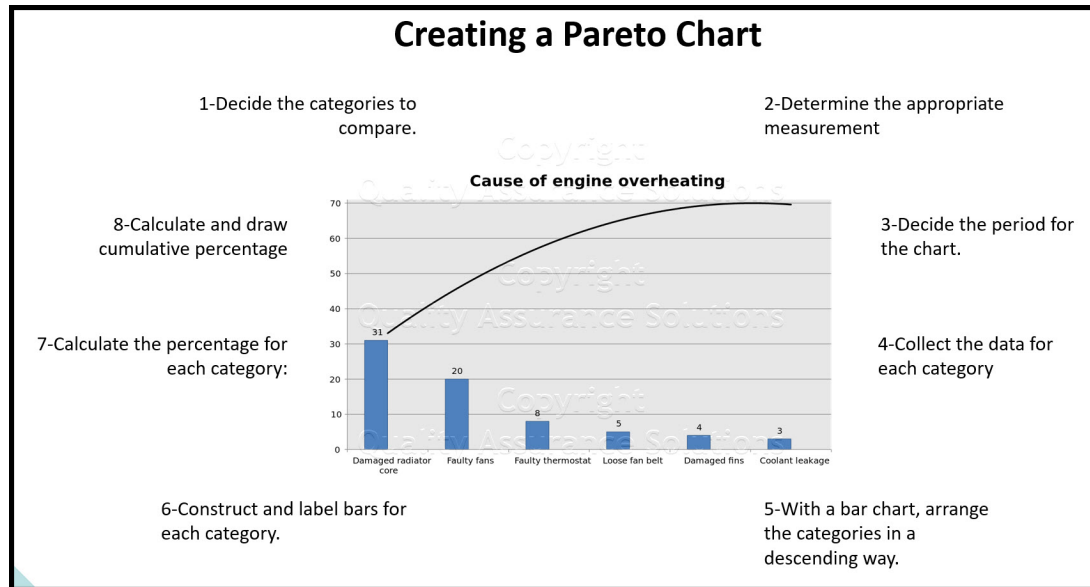
- **Be driven to improve & be flexible** – think outside of the box & the current process you are operating in. Look for opportunities for improvement, then determine feasibility. Not every solution can be implemented, but all should be discussed (i.e., is it in the budget, it may need to be phased in due to cost).
- **Embrace Progress as an organization with each other & as individuals** – Work as a team to raise issues & have discussions before non-conformances pop up. Be willing to change & support those implementing changes (i.e., licensing non-compliance may affect DWQMS.)

Techniques / Tools

- Pareto – statistical review looking for trends
- Ishikawa Diagram – cause & effect – fishbone, 5+ M's, PEEP's, etc.
- Structured Brainstorming – cross functional/departmental team thinking outside of the box
- Quasi-5 why's+ combinations

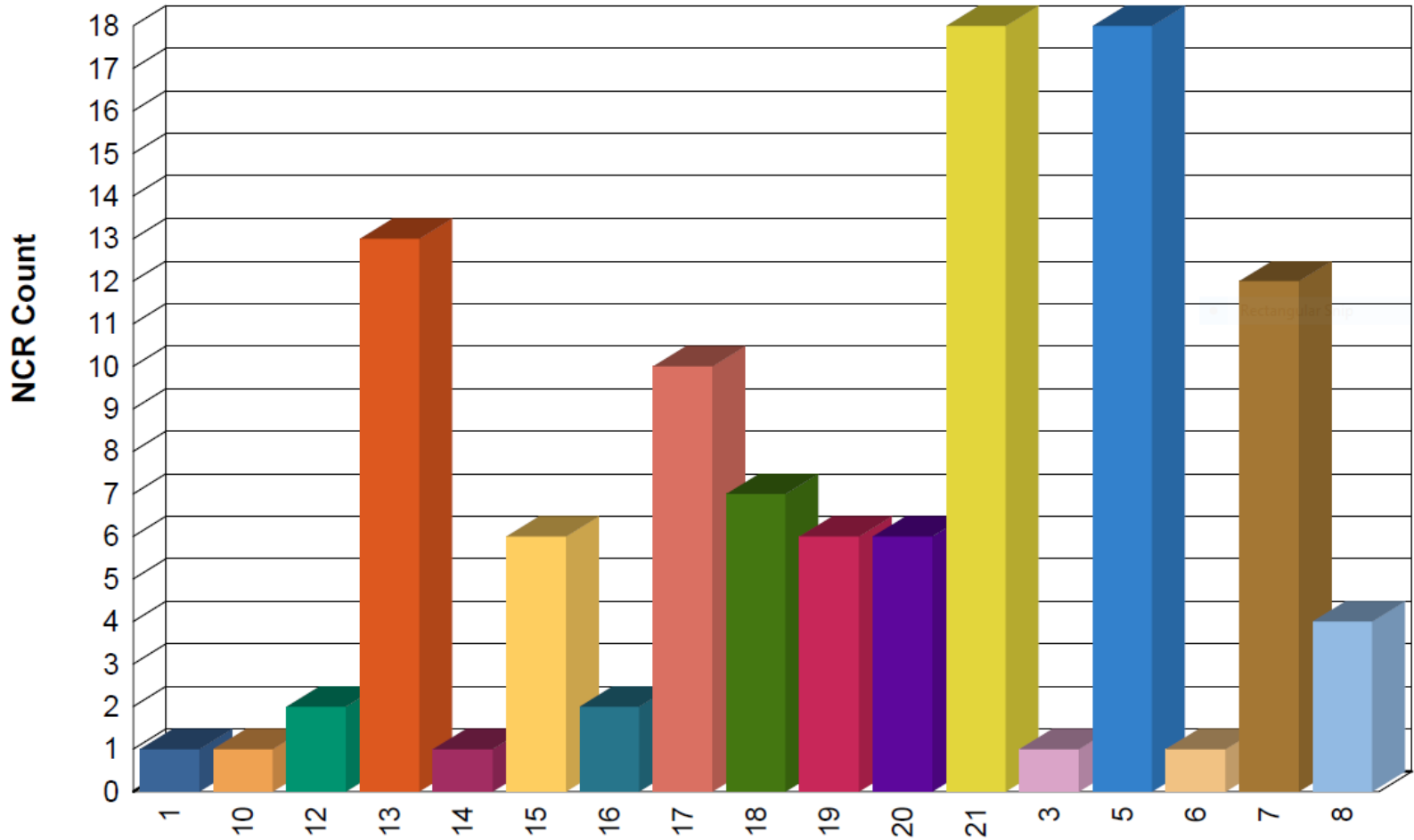
Techniques / Tools_{cont'd}

- Pareto chart is a statistical chart that represents problem frequency



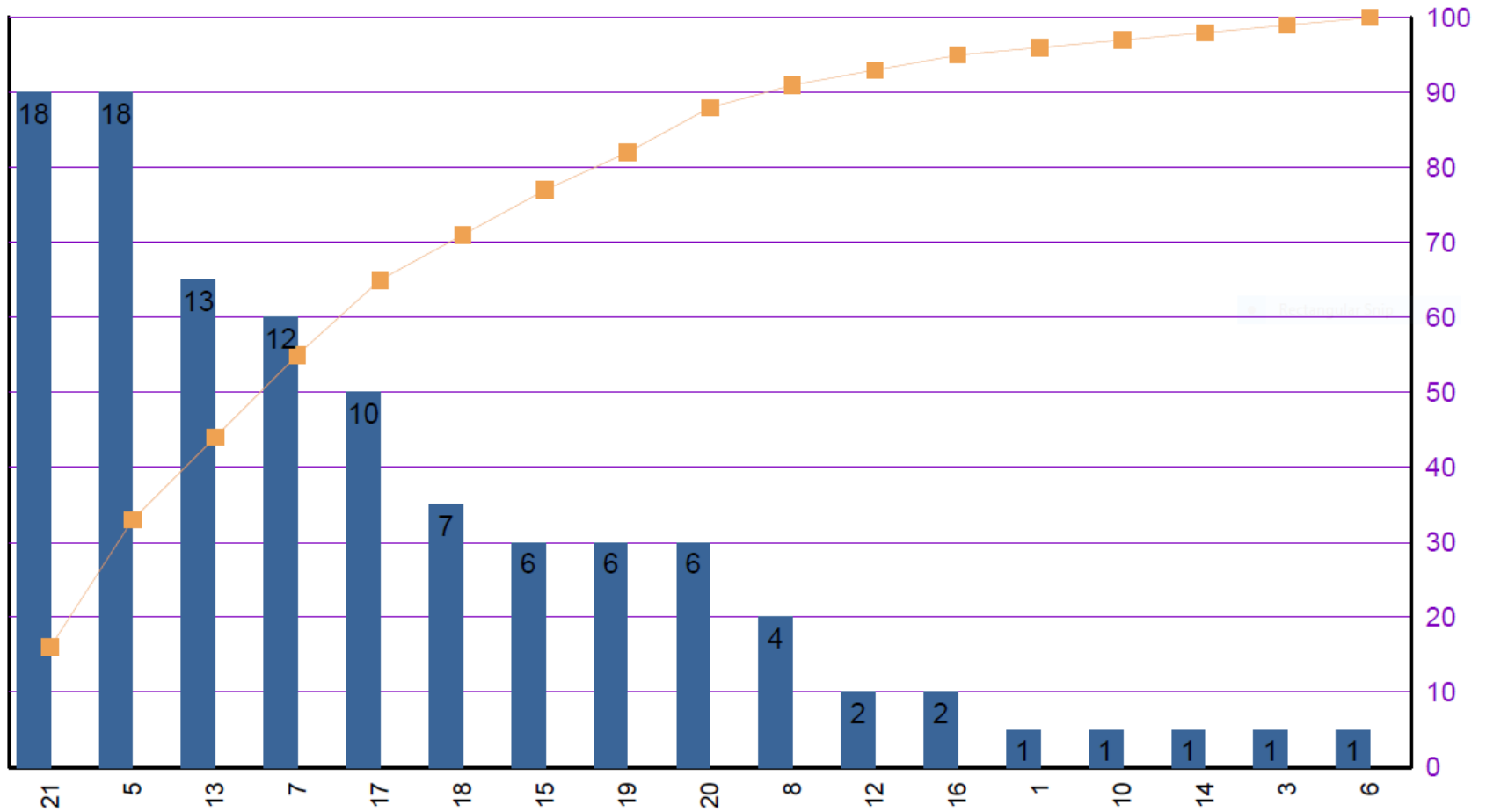
Techniques / Tools cont'd

just a histogram



Techniques / Tools cont'd

When histogram is organized as a Pareto chart



Techniques / Tools cont'd

- Pareto chart is a statistical chart that represents problem frequency.

PROS

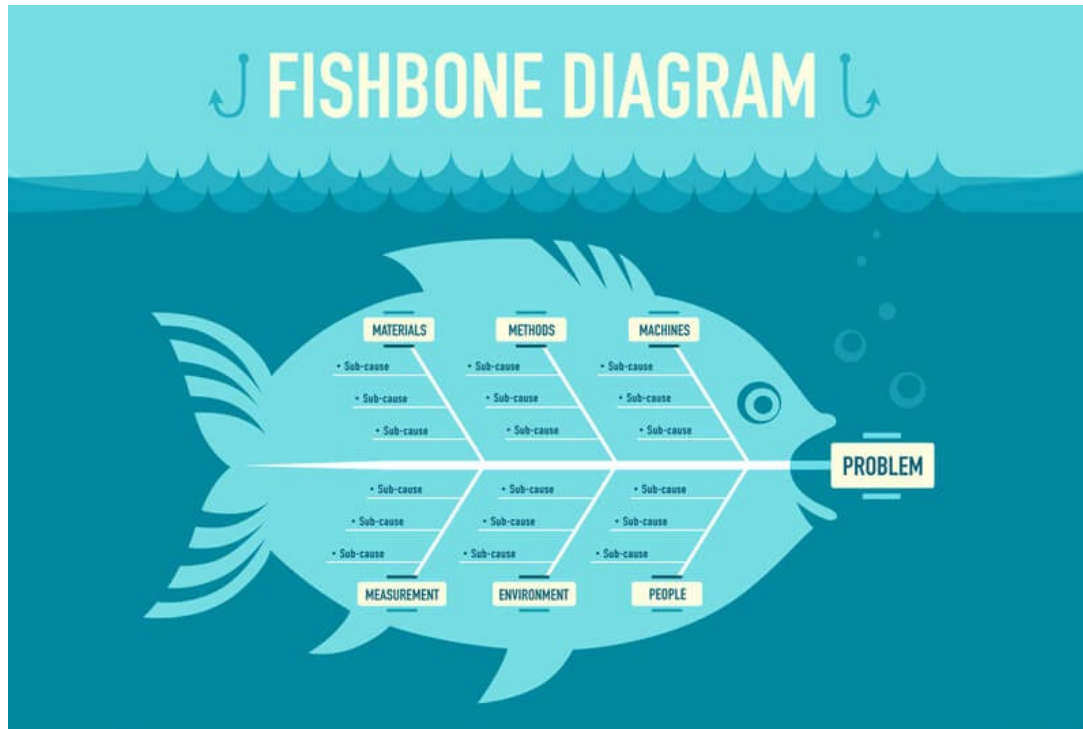
- ✓ considers frequency of a problem
- ✓ can also determine cumulative impact of defect
- ✓ helps in solving issues regarding problem-solving & decision making, time management – its quick
- ✓ Allows for a focusing on a particular cause

CONS

- ✗ Severity not considered.
- ✗ Pareto analysis cannot be applied to all cases
- ✗ Ironically, allows for focusing on a particular cause

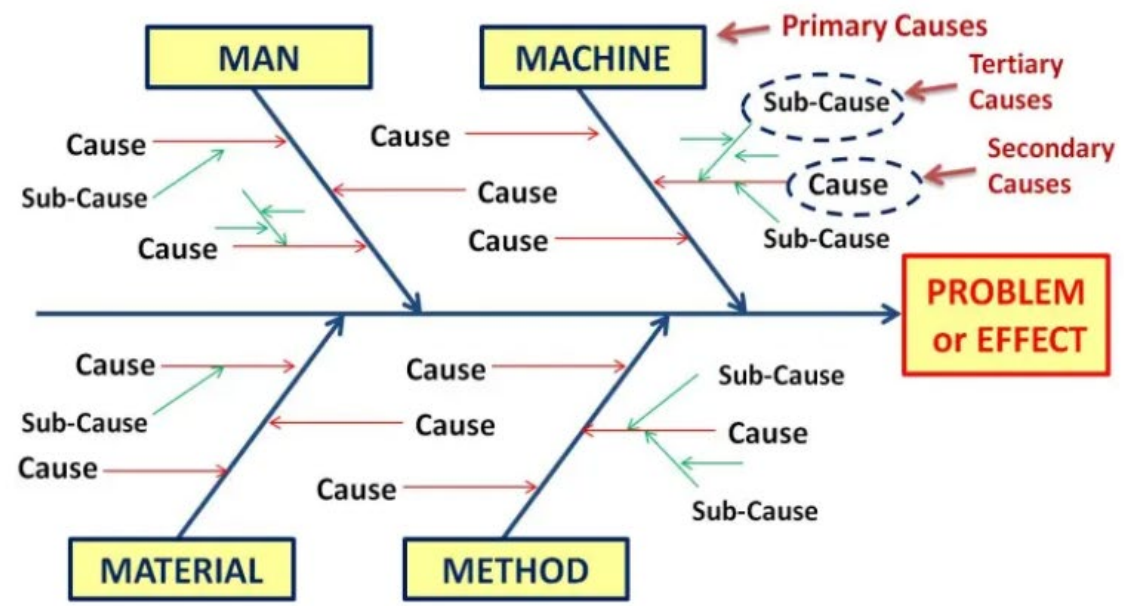
Techniques / Tools_{cont'd}

- Ishikawa Diagram – cause & effect – fishbone, 5+ M's, PEEP's, etc.
- A graphical representation that helps visualize the many potential causes of a problem.



Techniques / Tools cont'd

CAUSE AND EFFECT DIAGRAM



Techniques / Tools cont'd

- Ishikawa Diagram – cause & effect – fishbone, 5+ M's, PEEP's, etc.

PROS

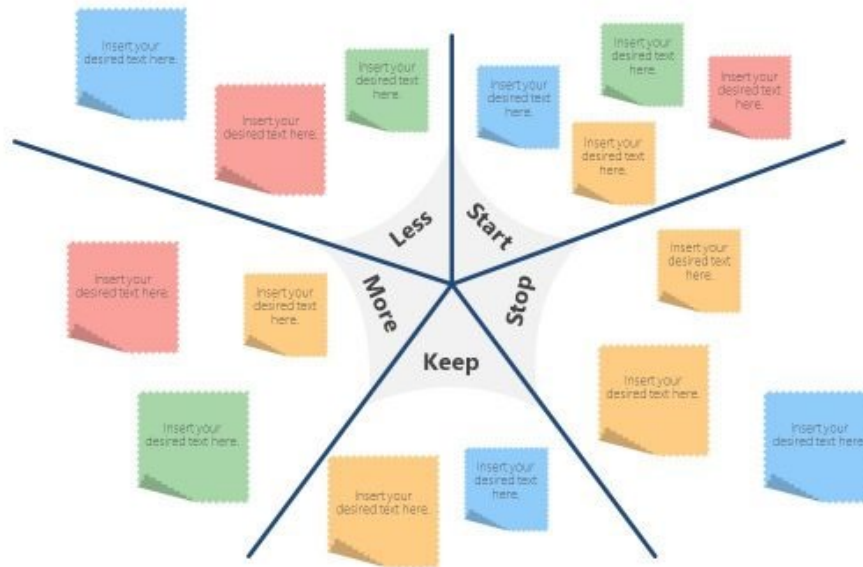
- ✓ Provides a visual overview of all possible causes, making it easier to understand complex relationships & multiple potential causes.
- ✓ A structured process to identify potential causes & explore their interactions.
- ✓ Encourages cross-functional teams to collaborate & share insights.
- ✓ Is based on available data & evidence, supporting informed decision-making.
- ✓ Can use a 5 whys for each of the bone structure

CONS

- ✗ Provides structure for hypotheses but not the answers
- ✗ The bone structure can be biased & are guesses at the causes of human error
- ✗ Don't help the investigator determine what happened; which is needed before determining why it happened (no proof that bones are the root cause)
- ✗ No guidance to help investigators develop effective corrective actions – leaving team to pick 1 of 3 standard actions; training, procedures or discipline.

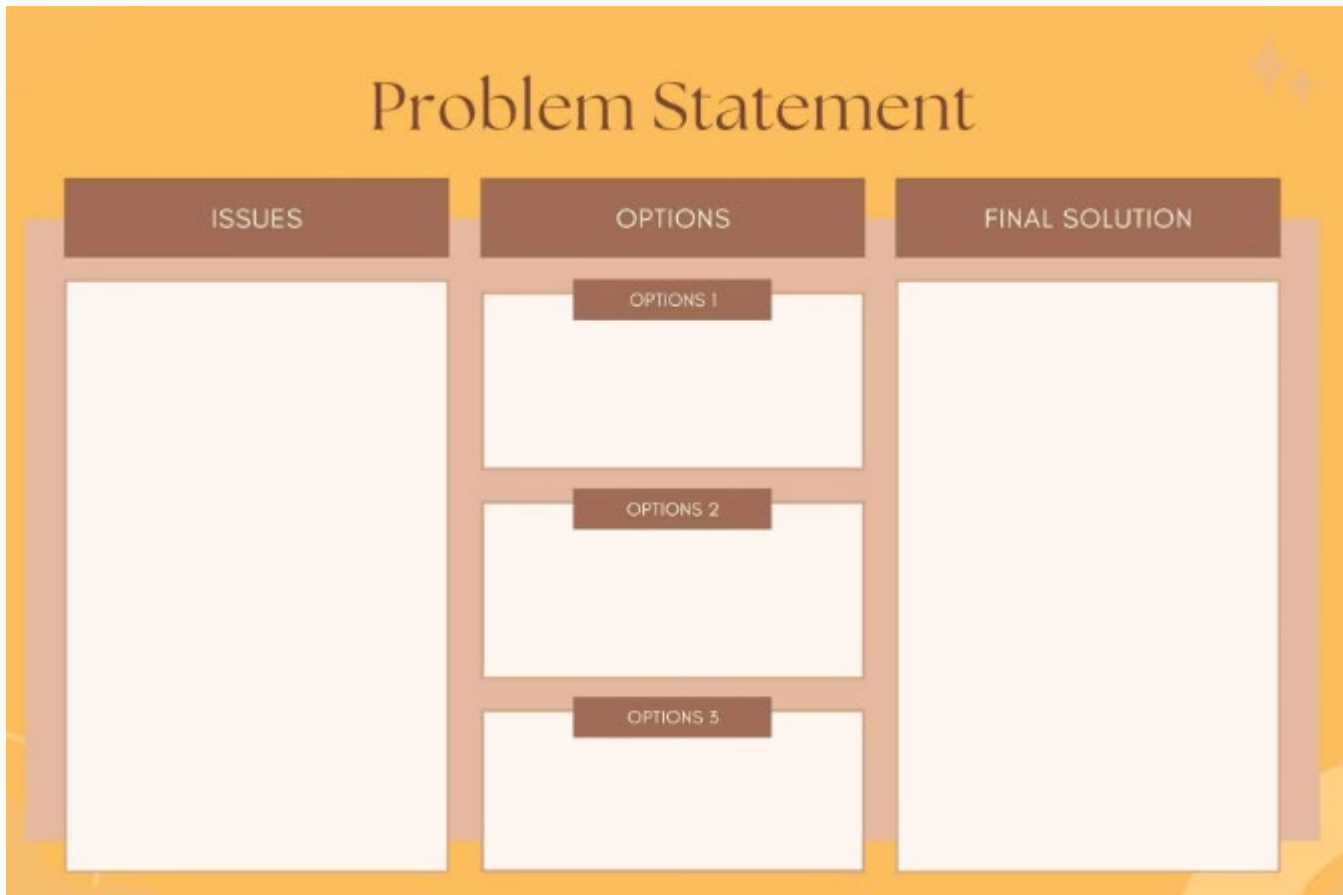
Techniques / Tools cont'd

- Structured Brainstorming – cross functional/departmental problem-solving method for generating creative ideas in a group setting



Techniques / Tools cont'd

- Brainstorming – just one example



Techniques / Tools cont'd

- Brainstorming is a group process. Everyone in the group gives an idea in rotation (or passes his/her opportunity to give an idea) until the next round.

PROS

- ✓ Input from cross functional groups; diverse perspectives
- ✓ Avoids bias of a particular group
- ✓ Generates lots of ideas in short time and opportunities to explore
- ✓ Simple

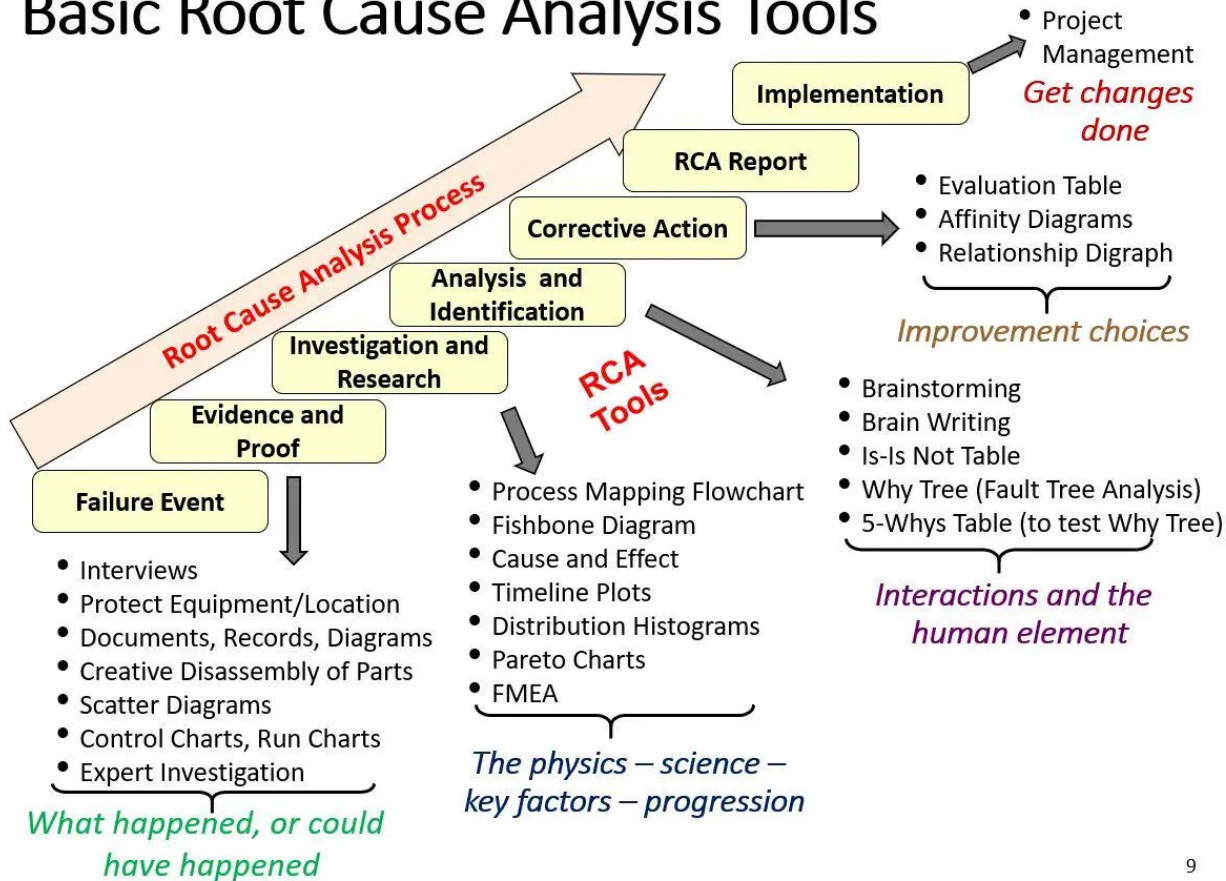
CONS

- ✗ Bias of collective knowledge and experience
- ✗ Can result in disorganized conversations & free-for-alls that fail to produce any actionable ideas; arguments
- ✗ Potential for groupthink
- ✗ Potential dominance of personalities – hinders creative process
- ✗ Makes it easy to not participate/not for everyone

Techniques / Tools cont'd

➤ Quasi-5 why's+ combinations

Basic Root Cause Analysis Tools



Techniques / Tools cont'd

- Quasi-5 why's+ combinations

PROS

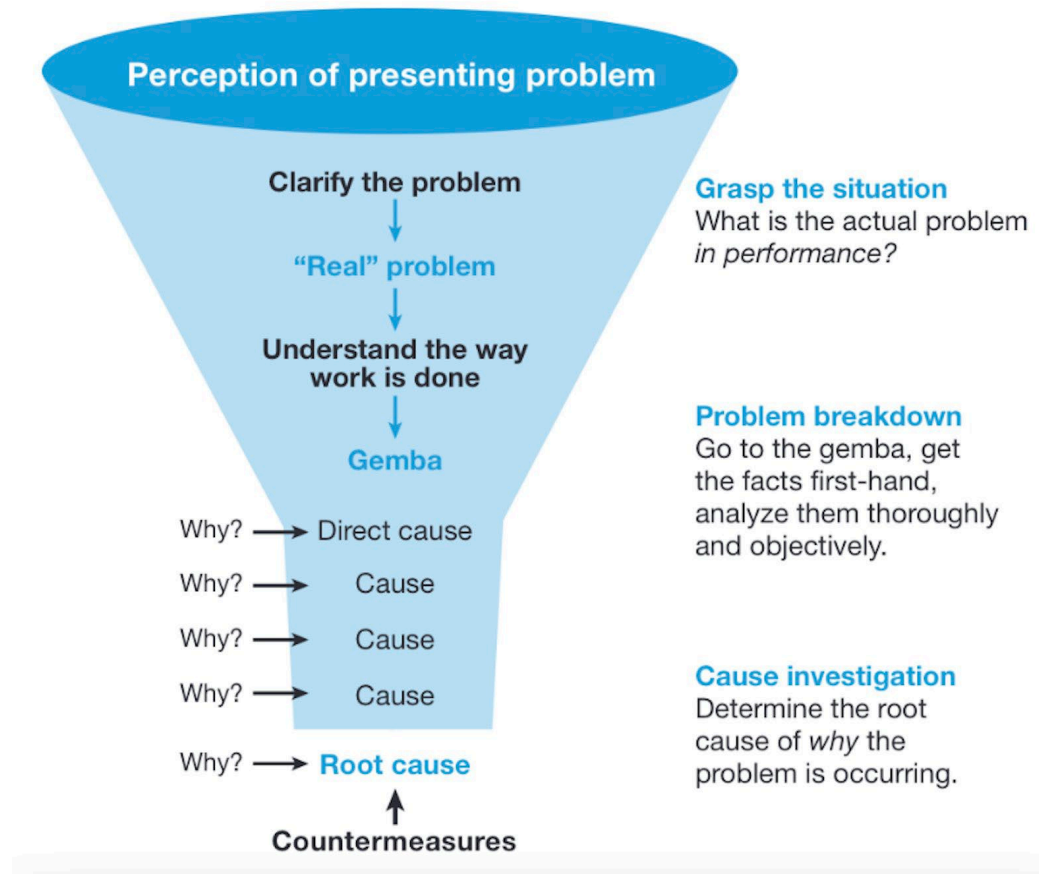
- ✓ By using a combination of several techniques, the CONS listed by the individual methods are reduced or mitigated
- ✓ Variation of outcome can be minimized
- ✓ Root cause(s) validated by different methods
- ✓ More likely to identify actual root cause(s) & develop suitable corrective actions

CONS

- ✗ Can be complex & time consuming

Techniques / Tools cont'd

➤ 5 why's



Techniques / Tools cont'd

- 5 why's is asking why repeatedly whenever a problem is encountered in order to get beyond the obvious symptoms to discover the root cause.

PROS

- ✓ Simple & fast

CONS

- ✗ Simple & fast – too simple for complex problems with multiple causes;
Stopping at symptoms
- ✗ Not asking the right Why questions.
- ✗ Not repeatable - Different people build different 5 why's.
- ✗ Focuses on a single root cause
- ✗ Confirmation Bias/Limited by the investigator's knowledge.
- ✗ Does not identify root cause behind human factors – human error is not a root cause.
- ✗ Deductive reasoning can't go beyond the person's current knowledge

Review

➤ Continual Improvement via problem solving

- day-to day operations, non-compliance issues & any internal/external DWQMS non-conformances
(“Taking what you do well and finding a way of doing it better.”¹)

➤ Corrective Action Response

- **Containment** fixes the finding raising a gap in the QMS (*“Correction is the action taken to eliminate a detected non-conformity of the QMS with the requirements of the DWQMS or undesirable situation.”²*)
- **Root Cause Analysis** investigates what caused the gap (*“Observe the process, identify and select potential causes, test your theory – determine the real reason for the issue.”³*)

1. Page 81 WCWC Participant Manual Rev. 2 01_25_Slide 84 Manual_2019

2. Page 81 WCWC Participant Manual Rev. 2 01_25_Slide 84 Manual_2019

3. Page 84 WCWC Participant Manual Rev. 2 01_25_Slide 88 Manual_2019

Review cont'd

- **Corrective Action Plan** fixes the Root Cause Analysis (*“Corrective Action: apply the permanent solution that has been designed to eliminate the cause of the problem.”⁴*)
- **Verification Plan** checking for effectiveness (internally you can have a mini-audit to see if your CAPA is successful via no more incidents)
 - ✓ **Prevention** the corrective action plan should have the prevention built in to truly be effective to avoid the 3 F’s (fix it fast & forget about it).
 - ✓ **Monitoring** after monitoring to see if the problem occurred again or was prevented by the new processes put in place to fix the root cause.

Group Work

- Each group will receive a non-conformance that was prevalent across DWQMS in 2023 & a method.
- Based on this breakout session, how will you get to the Root Cause Analysis using one of the pre-selected Techniques:
 - **Pareto** – statistical review looking for trends
 - **Ishikawa Diagram** – cause & effect – fishbone, 5+ M's, PEEP's, etc.
 - **Structured Brainstorming** – cross functional / departmental team thinking outside of the box
 - **Quasi-5 why's+ combinations**

Group Work cont'd

- ✓ Best Practices for Root Cause Analysis & Wrap-Up: beyond the 5 Why's, which method or combination of methods will you utilize in future problem solving?
- ✓ Avoid the 3 F's: Fix it, Fast & Forget about it

Questions???

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