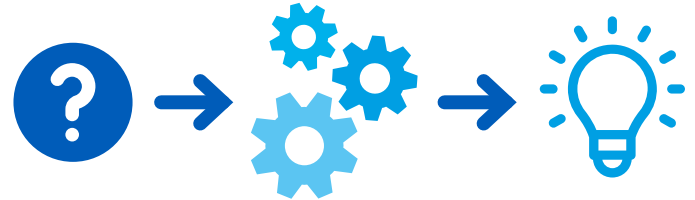# The Importance of Root Cause Analysis During Incident Investigation

A root cause analysis allows the employer to discover the underlying or systemic, rather than the generalized or immediate, **causes of an incident**. Correcting only an immediate cause may eliminate a symptom of a problem, but not the problem itself.

By conducting a root cause analysis and addressing root causes, an employer may be able to substantially or completely prevent the same or a similar incident from recurring. In this way, employers will reduce the risk of death and/or injury to their employees.

An employer conducting a root cause analysis to determine whether there are systemic reasons for an incident should consider all possible "what," "why," and "how" questions to discover the root cause(s) of an incident.

What?

How?

Why?

This document presents a list of tools that may be used by employers to conduct a root cause analysis, with an analysis of their pros and cons. This list is not exhaustive, and a combination of tools can be often used.

> **A root cause analysis allows the employer to discover the underlying or systemic causes of an incident**

5 Why Analysis

- Analysis 5x Why? – is one of the tools allowing to detect the root causes of problems.

- It was developed in the 1930s., but became popular in the 1970s.

- It is effective tool for simple or moderately difficult problems.

- When starting the analysis you should define problem/incident.

- The method is quite simple: when a problem occurs, you go down to its root cause by asking "Why?" five (or less) times. Then, when a countermeasure becomes visible, you follow it through to prevent the problem from re-occurring.

- Example how to use this method you can find on website i.e. https://www.mindtools.com/pages/article/newTMC_5W.htm

- Follow Deming Cycle Action Plan (PDCA) or PDSA (Plan/Do/Study/Act).

Remember! It's OK if there is less than 5 "Why". But if "Why" is more than 5, you should return to the description, find experienced facilitator or choose another method (maybe the problem is too complex for 5Why).

Note:

A countermeasure is an action or set of actions that seeks to prevent the problem from arising again.

A solution may just seek to deal with the symptom.

Positives	Negatives
Effective tool for simple or moderately difficult problems/incidents	Doesn't work well with complex problems/incidents
Method is quite simple to use	Can lead to pursue a single track or a limited number of tracks
Requires short induction before use	Easy to "manipulate" – it means it's easy to jump from problem to solution if there is no facilitator
Doesn't require very experienced facilitator	If "Why" is more than 5, you should return to the description, find experienced facilitator or choose another method (maybe problem is too complex for 5Why).
	Sometimes needs continuation with different method
	Asking "Why" can be understood in some cases as looking for "Who"

Fishbone Analysis

- Fishbone Analysis was devised by professor Kaoru Ishikawa in the 1960s.

- It is also called a cause and effect graph and because of its distinctive appearance – a fish bone graph.

- This tool combines Brainstorming with Mind Map.

- It can be used to:
  - Discover the root cause of a problem.
  - Uncover bottlenecks in your processes.
  - Identify where and why a process isn't working.

- Preparation of fish bone analysis must always be a team action. The team should consist of people with appropriate specialist knowledge and open minds.

- There are 6 categories (causes) in this method: human, method, material, machine, measurements, environment, which are the main bones. Each category can be divided into sub-categories (sub-causes – small bones). All this finally leads to the fish's head – the analysed problem.

- Depending on the type of the problem it is also possible to use other categories, i.e. equipment, information, procedures, processes, work organization, competition, suppliers.

- The starting point is the definition of a clearly formulated problem (head/effect). The next step is to identify the causes and sub-causes.

Positives
Effective tool for simple or moderately difficult problems/incidents
4-stage process
Shows the causes and sub-causes (grouping)
It is also possible to use other categories than 6M
Combines Brainstorming with Mind Map
Can be used with post-its (silent brainstorm)
Requires short induction before use

Negatives
Requires setting rules before start of analysis (possible causes or only confirmed causes?)
Requires additional method of causes/sub-causes prioritization
Requires strong focus and identification of root causes as pre-final step

How to use this tool:

https://www.mindtools.com/pages/article/newTMC_03.htm
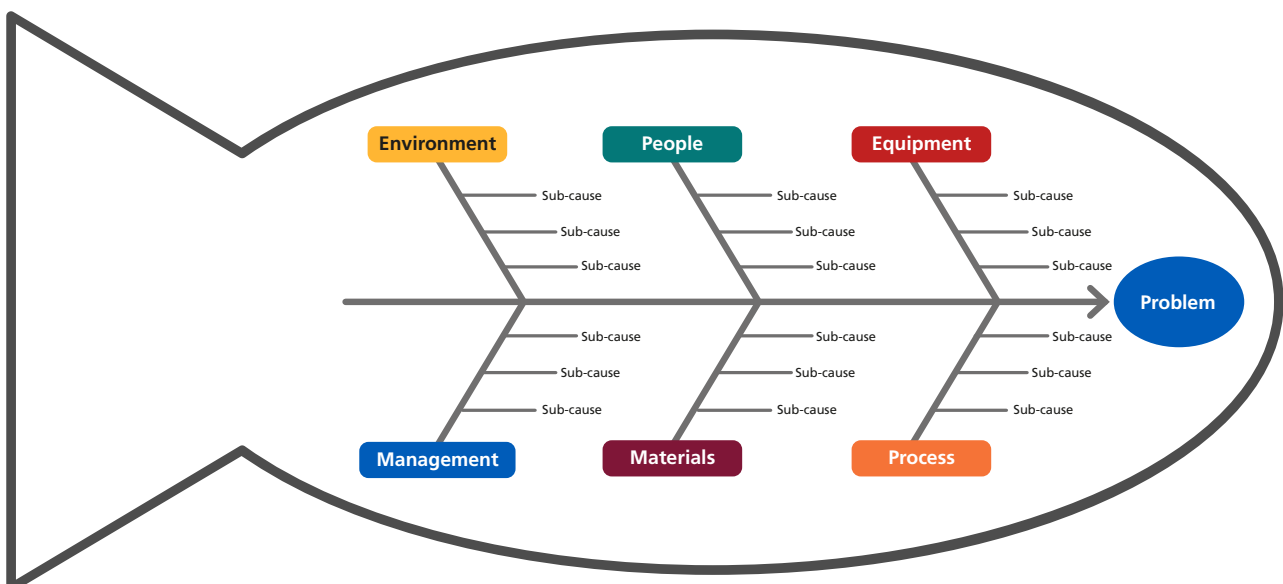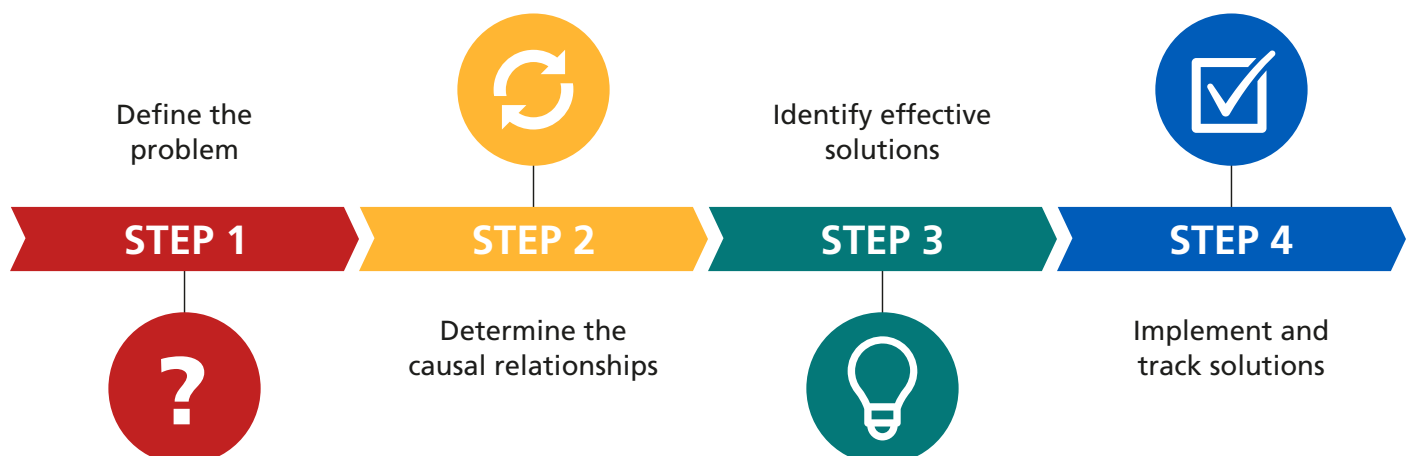
Apollo Root Cause Analysis

- It can be used to look for root causes of complex problems/incidents/accidents.
- Methodology is a 4-stage process (see picture).
- In this method the "problem" is defined by answering specific questions.
- The causes and effects that led to problem/incident occurrence are determined by asking questions: "caused by …".
- The uniqueness of the method lies in the assumption that:
  - each effect is the result of at least 2 causes,
  - causes are divided into condition and action,
  - elimination of causes defined as "condition" gives a greater chance of minimizing or eliminating the possibility of such an event in the future, because people's behaviour ("action") is a less predictable and controlled element.

All causes must be examined to find a way to change them with a solution that is:

- Within your control.
- Prevents recurrence.
- Meets your goals and objectives.
- Does not cause other problems.
- This approach shows clear causal connections between your solution and the defined problem.

Positives
It can be used to look for root causes of complex problems/incidents/accidents
4-stage process
Can be used with post-its (silent brainstorm)
Provides wide perspective
Provides graph of causes from present to past (visualisation)
Doesn't focus on "Who" or "Why" – only on "Caused by"

Negatives
It should be used for existing problems/incidents/accidents.
Requires training before use and experienced facilitator
Requires strong focus and identification of root causes as pre-final step
For small/simple problems can be too time consuming
Requires data/evidence (preparation phase)

Source/more information:

https://www.apollorootcause.com/page/about/apollo-root-cause-analysis-method
https://www.apollorootcause.com/page/about/root-cause-analysis-examples

Define the problem

Identify effective solutions

STEP 1 **STEP 2** **STEP 3** **STEP 4**

Determine the causal relationships

Implement and track solutions