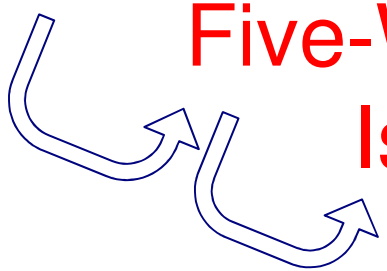
SUPPLIER QUALITY TRAINING

Problem Solving

8D Eight Disciplines

Five-Whys Process

Ishikawa-fishbone diagram



Eight Disciplines of Problem Solving (8D)

8D method is a team based problem solving approach/process of 8 critical steps with a focus on actions to contain, correct and prevent recurrence of the problem

1D	ESTABILISHING THE TEAM	Establish the team from different departments and choose a team leader
2D	PROBLEM DESCRIPTION	Clearly describe the problem in order to understand what went wrong
3D	CONTAINMENT ACTION	Stop the process, put a temporary fix in place (e.g., introducing 100% inspection)
4D	ROOT CAUSE	Brainstorm on finding the root cause(s) of the problem, why was is not detected
5D	CORRECTIVE ACTION	Choose and verify the permanent action plan
6D	VALIDATE CORRECTIVE ACTIONS	Validate whether corrective action(s) are efficient, problem is monitored
7D	PREVENT RECURRENCE	Improvements in systems and processes would prevent problem from recurring
8D	CONCLUDE AND CONGRATULATE TEAM	Summarize the learnings and close the case

CLARIOS

1D – Establishing the team

First step is establish the team consisting of persons, that will be responsible for realizing particular steps of 8D

Quantity of team and their making-up depends of the complexity of the problem and taken decision

The team should fulfill the following steps :

- Have a good knowledge of the product and processes
- Multidisciplinary – people from different departments
- Have adequate capability to introduce proper solution of the problem
- The team should have a Leader, who supervises and closes 8D

2D – Problem description

During this step, you need to describe the problem in the most accurate way

It is recommended that the description of the problem includes :

- Proper description of the problem, not restricted to laconic statements
- Place problem detected.
- Scale of problem, eg. % of reject or qty of pcs / range deviations beyond the tolerance
- etc.

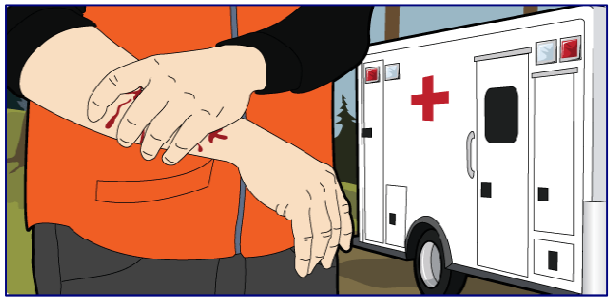
It's very important that the problem is „measurable",
⇨ How many %, ppm or in any another unit of measure

Later, this allows to properly assess whether corrective actions are implemented efficiently or not

Problem Definition => clear and accurate, problem defined as the customer sees it, do not add cause(s) into the problem definition

3D – Containment action (emergency action)

This is the step where the right containment action is taken to prevent escalation of the problem (further making defects) or at the worst delivering not conforming products to the customer



Example of action(s) :

- Stoppage of production/shipment
- Additional visual control
- Informing the customer about the problem (for verification of the goods at the customer)
- Segregation goods on OK/NOK
- Informing operators about the problem

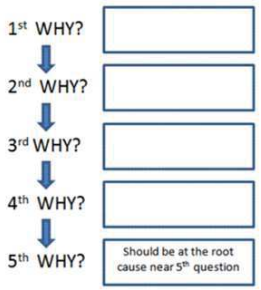
Check if similar products or processes, there is a similar risk
(if yes - should be implemented within the containment action)

4D – Root Cause

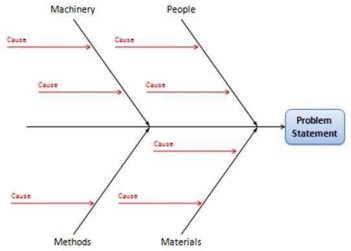
To really eliminate the problem, the real cause(s) of the problem needs to be identified.

This is not a simple step, therefore it is important to work in a team and to look at the problem from different sides

▸ Several tools can be used ⇨



⇨



The production process often throws up the cause of the problem on "**operator error**".

This is a mistake, the reason(s) are much deeper :

- Lack of properly tools
- Lack of training and/or training are not efficient
- Overtime work in a hurry (effect of wrong decisions of the management)
- The production process is not suitable for quality requirements

5D – Corrective action

The Team determines which action(s) should be introduced in a **mid term period of time** to ensure that the process/product is under control

Examples :

- Introducing additional control in the process
- Introducing additional other process (e.g., component reworked, test corrected)
- Rework defective units found inside
- Rework units returned from customer
- Inform the supplier about defective part delivered and their exchange, etc.

6D – Validate corrective action

Verify that the corrective action(s) taken are efficient.

It should be based on "real data" from the process.

Examples :

- Less reject % (ppm) in process
- Test/control results show improvement
- Engineering's measurements (dimension, units appearance) are correct, according to tolerance, specification
- Supplier deliver goods of better quality

7D – Prevent recurrence

Next step is to determine what action(s) should be taken to prevent recurrence of the problem

Examples :

- Modify or make proper tooling
- Change the process parameters in order to prevent defects
- Change process/tools by supplier which make the parts
- Change procedure(s) (organization change)
- Change documentation (FMEA, PCP, Work Instruction …) /specification (if it was incorrect)

8D – Verify and congratulate Team

The Leader of the Team will verify the 8D before closing the case

Draw conclusions as the Team worked, what the individual members have learned and what are the conclusions for the future - what other process can be improved, what tools, etc…

Lessons learned should be documented, and at the end of the process, congratulate the team.

5 Why

5-Why is a simple approach for exploring root causes, it is applicable when you are facing problems where responses can be given through a discussion rather than analysis and/or experimentation.

Analysis of **5-Why** must include 2 aspects :

1/ <u>Why did the problem exists</u> ?

We are wondering about root cause(s) of the problem and **why** the defect was produced ?

2/ <u>Why was it not detected</u> ?

We have to think **why** our current system/method of control/monitoring process did not detect the problem when it has occurred ?

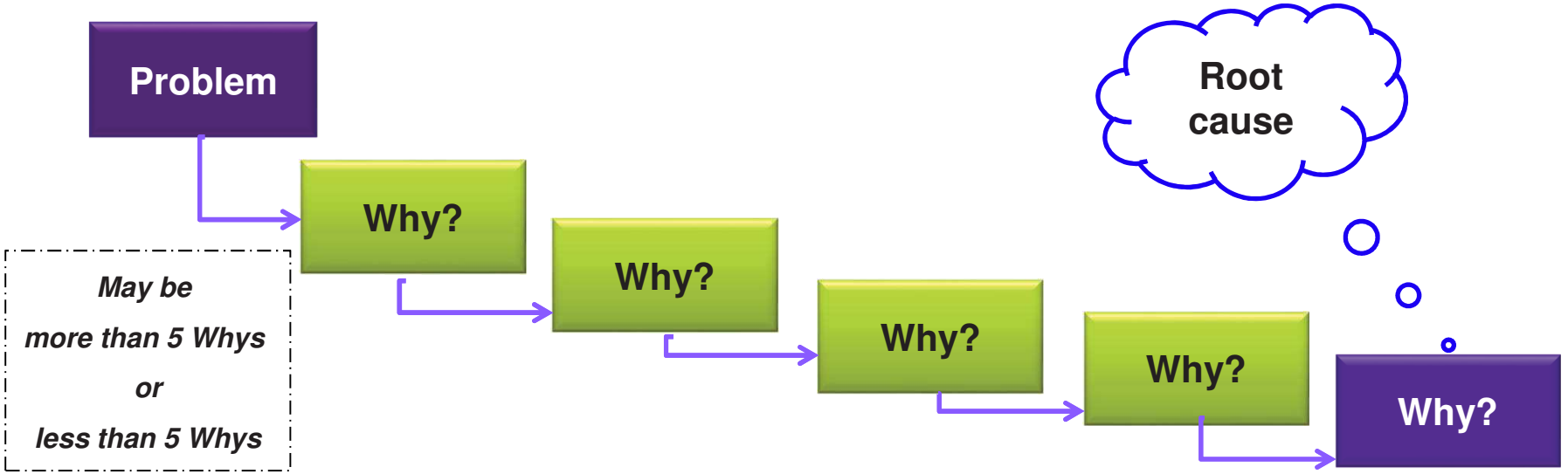
How to use 5-Why?

1. Collect all possible information
What exactly happened ? When ? What is the scale of the problem ? What is the risk for customer ?

2. Create the Team
Find the right people that could help to determine the cause

3. Clearly describe the problem

4. We begin to question
Method 5-Why is all about to ask 5 times questions Why ?



5-Why – Drill Deep Analysis

1/ Specific - Problem statement
Why did we have this "Specific Problem" ?

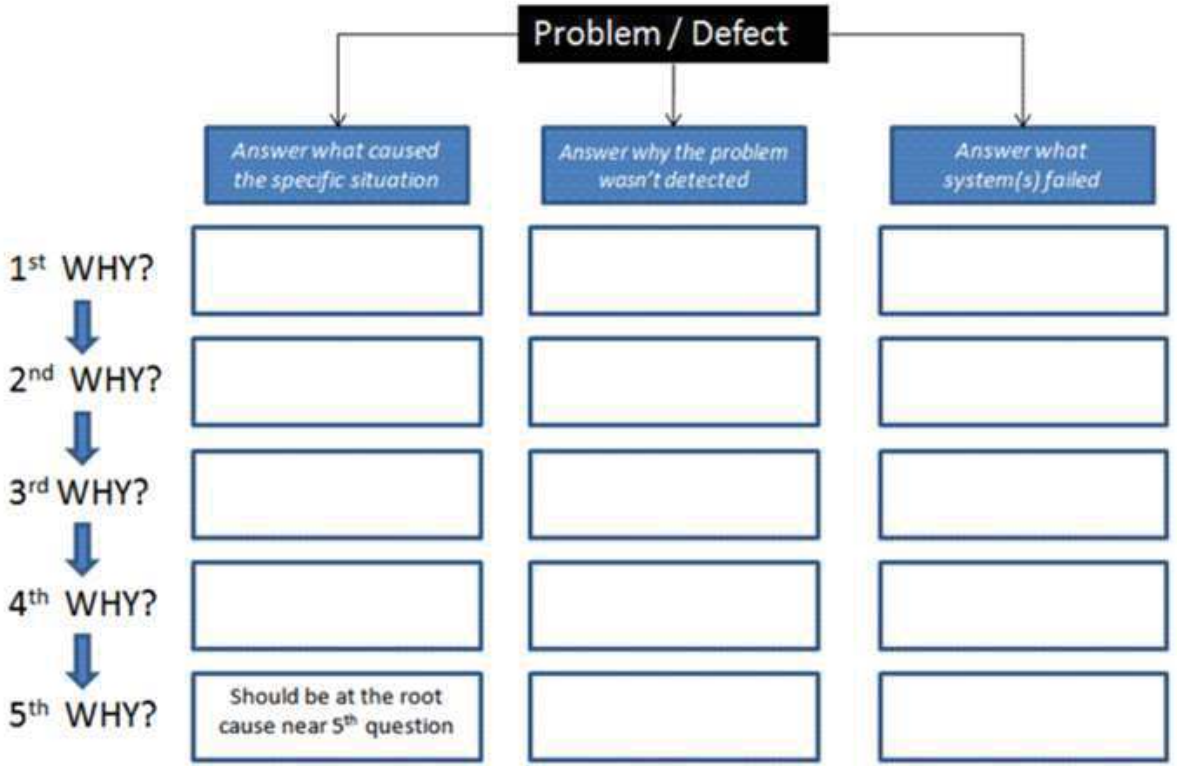
Why did we have the problem/the specific non-conformance ?

2/ Detection
Why was the problem not detected (internally) ?

Why did the problem reach the customer ?

3/ Systemic
What system(s) failed ?

Why did the system allow it to occur ?



Microsoft Excel Worksheet

Example of 5-Why

PROBLEM : Missing hole "A"

Question 1 : Why is hole "A" missing?

Answer : Skipped operations - a detail was not treated (drilling)

Question 2 : Why did the operator skipp operations and did not give detail treatment ?

Answer : Details before and after drilling are next to each other

Question 3 : Why are the details before and after drilling next to each other?

Answer : There is no clearly defined place on the machine, the parts before and after drilling the hole

Question 4 : Why is not there a clear space on the machine for parts before and after drilling the hole

Answer : Process of production area has not established rules for identification of parts before and after drilling

Question 5 : Why did this area of production technologist not establish rules for identification of parts before and after drilling

Answer : There are no clear rules (guidelines) for the determination of products before and after the operation in the entire factory machining

5-Why

Advantages of 5-Why

- This method is simple to use and easy to apply to any organization
- Does not require knowledge of statistics
- You can easily and quickly make this method (simple and short training)

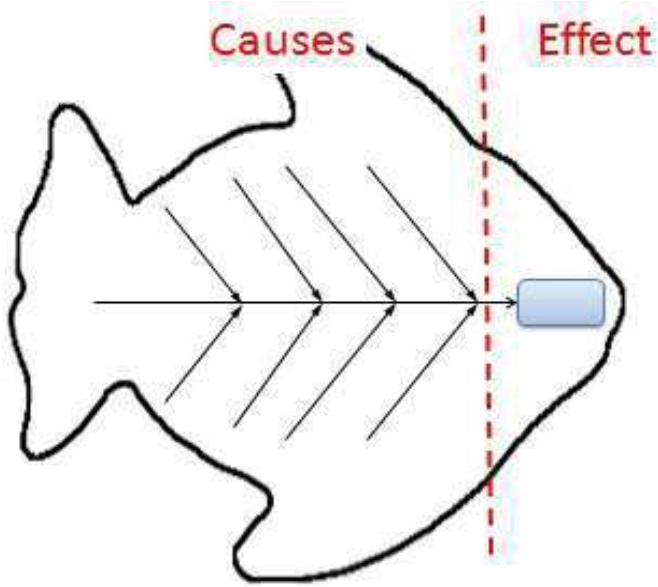
Summary : The method of 5-Why is just about to ask 5 questions “Why", **but** not all the time. Sometimes when you are asking the fifth question, can lead to absurd answers, so sometimes it is better to stop for e.g., on the 4th question. Of course, it may happen that you will ask 6-7 questions to get to the bottom of the case. Everything depends on the common sense approach to the subject.

Notice than, in most of the cases, "operator error" (human error), the real cause of the problem usually is somewhere in the system, organization, or in the method of operation.

Ishikawa (fishbone diagram)

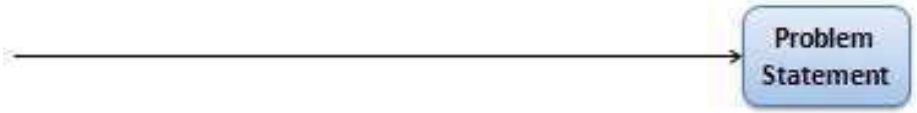
The left side of the diagram is where the **causes** are listed. The causes are broken out into major cause categories. The causes you identify will be placed in the appropriate cause categories as you build the diagram.

The right side of the diagram lists the **effect**. The effect is written as the **problem statement** for which you are trying to identify the causes.



Ishikawa (fishbone diagram)

1. **Draw Problem Statement** - Define problem correctly, that everyone agrees on the problem statement. Once your problem statement is ready, write it in the box on the right hand side of the diagram

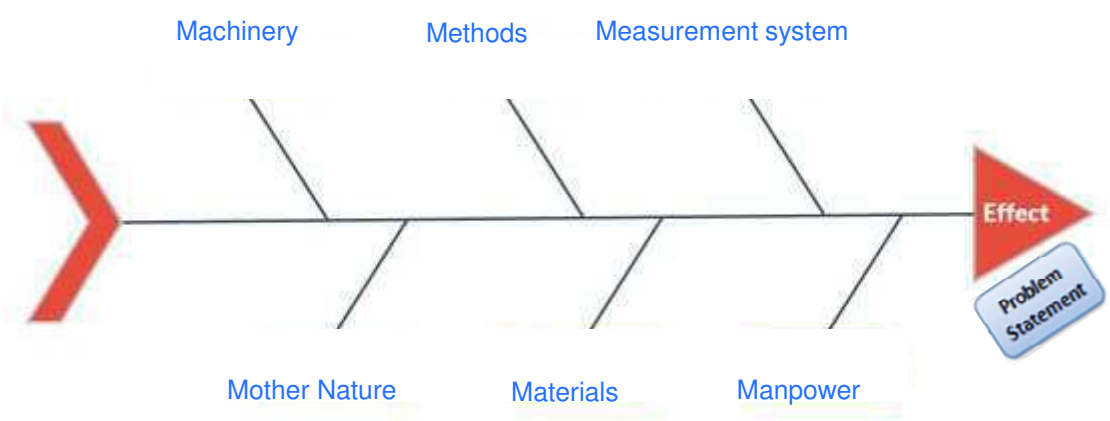


2. Draw Major Cause Categories.

Draw the *major cause categories* on the left hand side and connect them to the "backbone" of the **fishbone chart**

In a manufacturing environment, the traditional categories are 6Ms

- Machines
- Methods
- Measurement Systems
- Mother Nature
- Materials
- Manpower



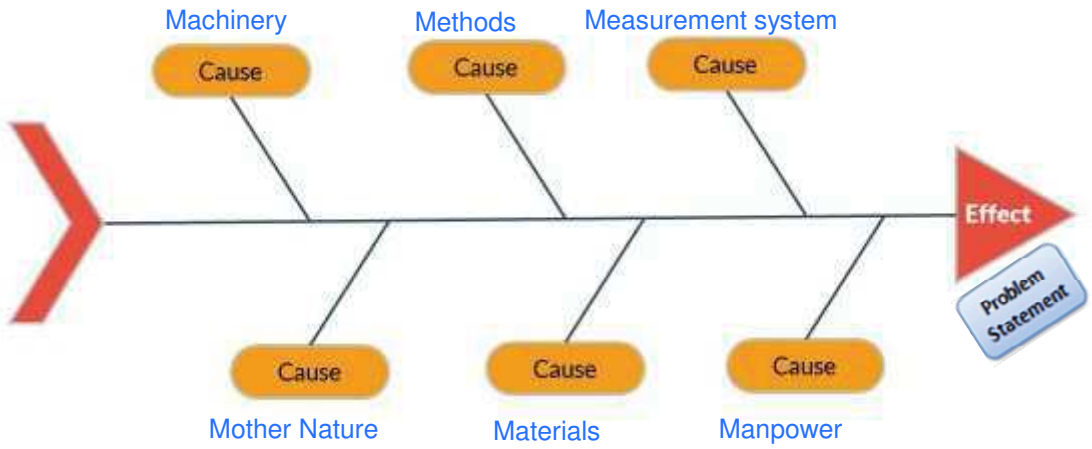
Ishikawa (fishbone diagram)

3. Brainstorm Causes

Brainstorming the causes of the problem is where most of the effort in creating your Ishikawa diagram takes place

4. Categorize Causes

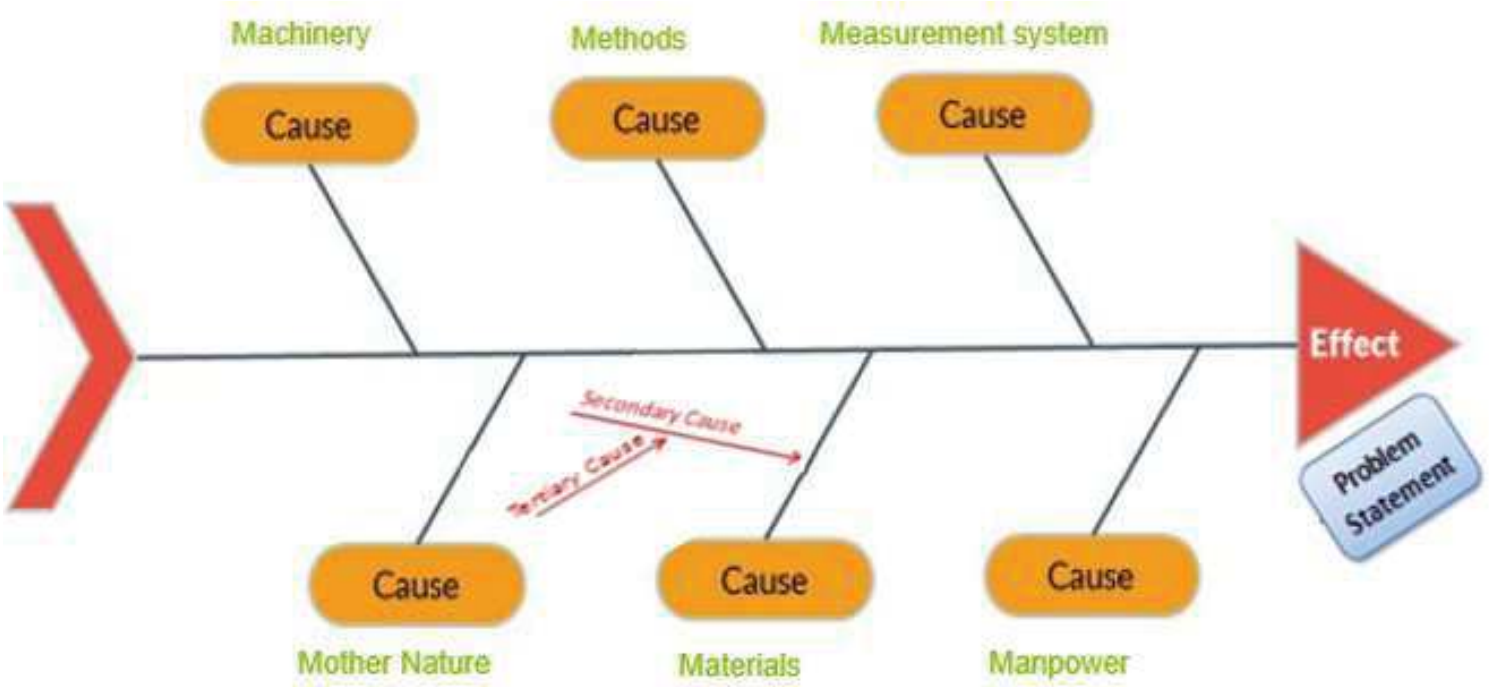
Once your list of causes has been generated, you can start to place them in the appropriate category on the diagram



Ishikawa (fishbone diagram)

5. Determine Deeper Causes

Each cause on the chart is then analyzed further to determine if there is a more fundamental cause for that aspect. This can be done by asking the question, "Why does it happen ?„ Use your judgment to decide when to stop.



Ishikawa (fishbone diagram)

6. Identify Root Causes

Identifying the root causes of the problem can be done in several ways ...

✓ Look for causes that appear repeatedly

✓ Select using group consensus methods

✓ Select based on frequency of occurrence

In Conclusion ⇨ Fishbone Diagram (FD)

FD is an excellent way to explore and visually depict the causes of a problem. The FD enables to determine the root causes of a problem. This will help to be more effective by focusing the actions on the true causes of a problem and not on its symptoms.