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ROOT CAUSE ANALYSIS (RCA)



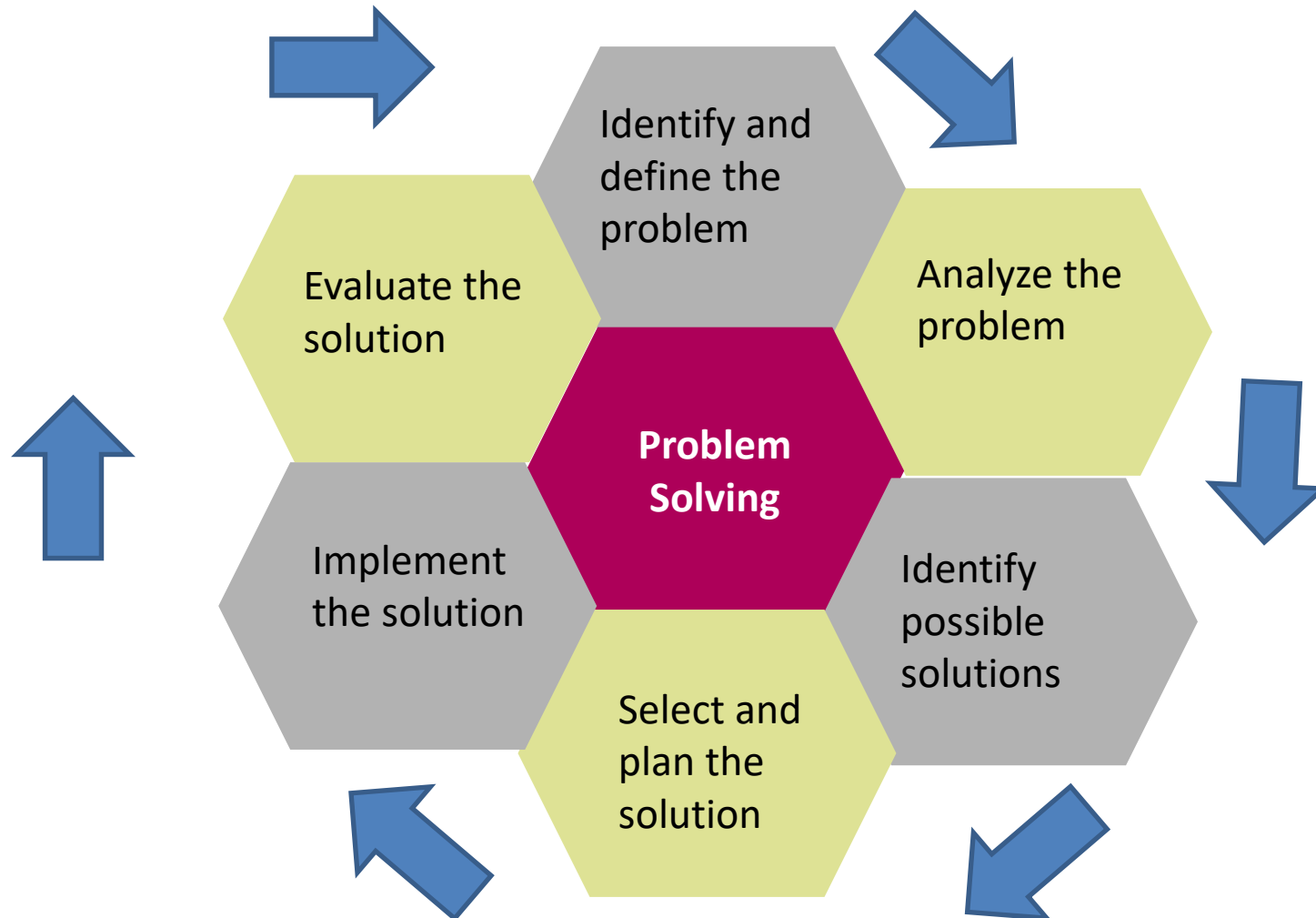
WHAT IS PROBLEM

A perceived gap between the existing state and a desired state





PROBLEM SOLVING STEPS





ROOT CAUSE ANALYSIS (RCA)

Introduction

Root Cause Analysis (RCA) is a method that is used to address a problem or non-conformance, in order to get the “root cause” of the problem. It is used so we can correct or eliminate the cause, and prevent the problem from recurring.



WHY ROOT CAUSE ANALYSIS (RCA)

Analyzing cause and effect becomes a pivotal activity in problem solving and process improvement. It links the identified problem or improvement opportunity (current situation) with its root cause (those elements that drive performance and need changing)



WHY ROOT CAUSE ANALYSIS (RCA)

Organizational effectiveness depends on two key elements judgment and execution, that is “**doing the right things**” and “**doing things right**”





WHY ROOT CAUSE ANALYSIS (RCA)

Cause-and-effect analysis not only helps to identify the deficient element, but also help focus attention on the potential causes for which more data might be needed.



TOOLS FOR ROOT CAUSE ANALYSIS (RCA)

Three tool are useful in helping to indentify cause-and-effect relationships:

- **Cause-and Effect Diagram (Fishbone diagram or Ishikawa diagram)**
- **Five Whys**



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Cause-and-Effect Diagram



What is it?

- An analysis tool that provides a systematic way of looking at effects and their respective causes
- Developed by Dr. Kaoru Ishikawa of Japan in 1943 and is sometimes referred to as an Ishikawa Diagram or a Fishbone Diagram because of its shape





Why implement this?

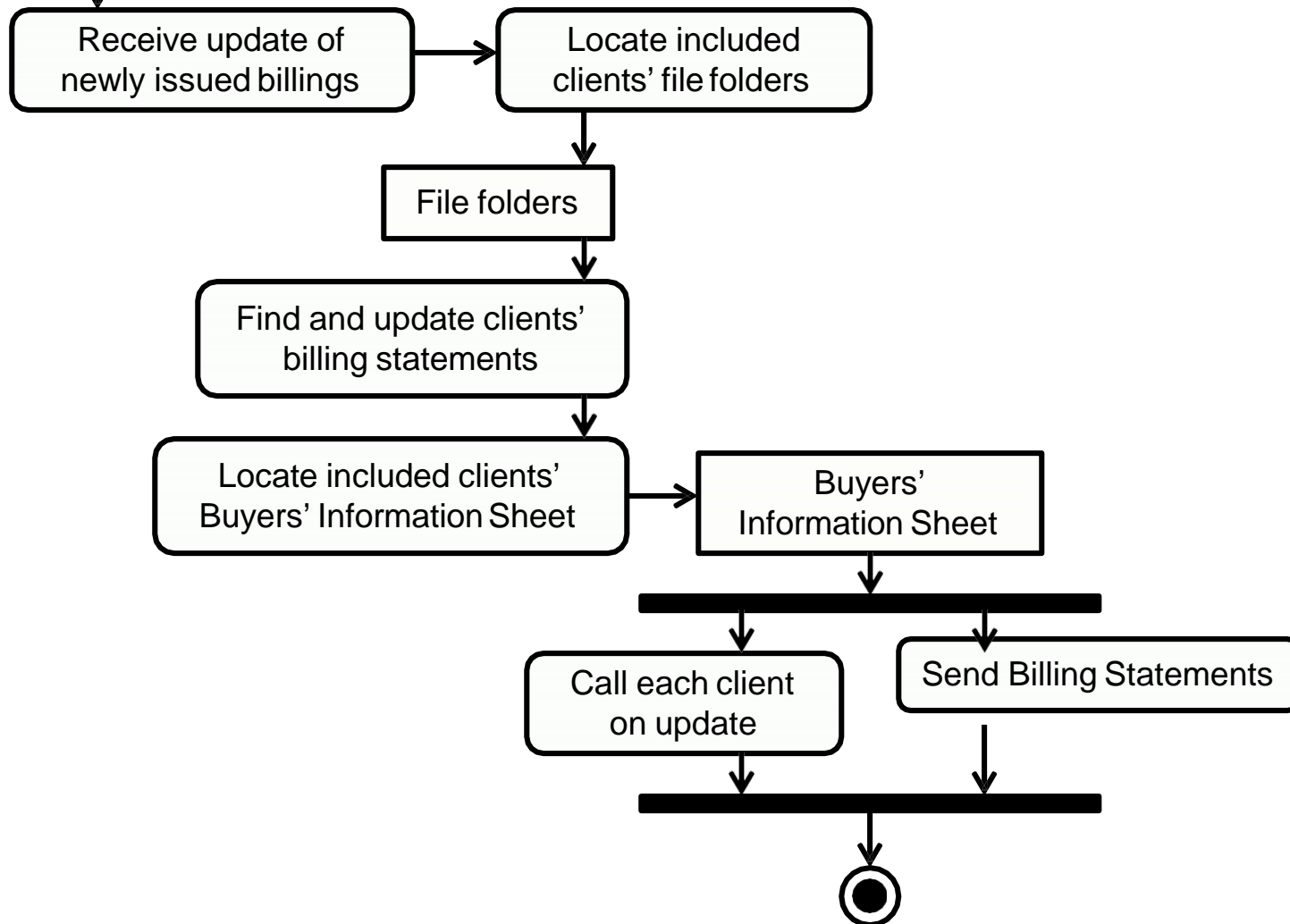
- It helps determine the root causes of a problem using a structured approach.
- It encourages group participation and utilizes group knowledge of the process.
- It uses an orderly, easy-to-read format to diagram cause-and-effect relationships.
- It indicates possible causes of variation in a process.



Why implement this?

- It increases knowledge of the process by helping everyone to learn more about the factors at work and how they relate.
- It identifies areas where data should be collected for further study.

● Submission of Billing to Client



STEP 1:



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Identify and clearly define the outcome or EFFECT to be analyzed.

- **Decide on the effect to be examined.**
- **An effect may be positive (an objective) or negative (a problem), depending upon the issue that is being discussed.**

STEP 1:



Identify and clearly define the outcome or **EFFECT** to be analyzed.

> **POSITIVE**

- pride and ownership over productive areas
- upbeat atmosphere that encourages the participation of the group

> **NEGATIVE**

- justifying why the problem occurred and placing blame
- easier for a team to focus on what causes a problem than what causes an excellent outcome
- concentrate on things that can go wrong may foster a more relaxed atmosphere which sometimes enhances group participation

STEP 2:

Draw the SPINE and create the EFFECT box.

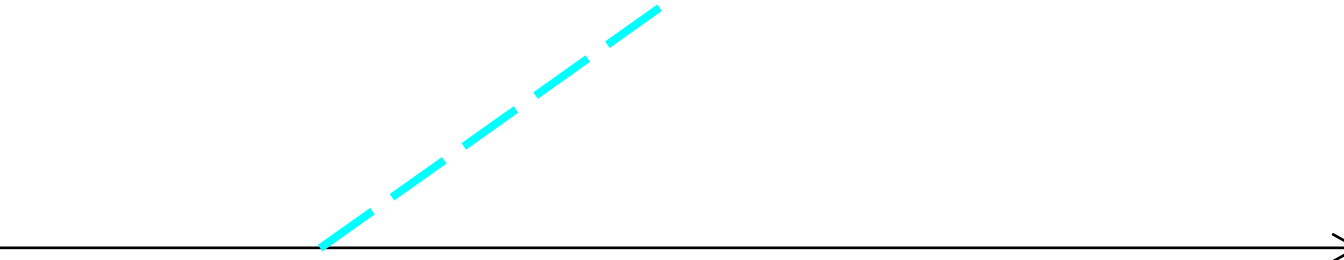
- Draw a horizontal arrow pointing to the right. This is the spine.
- To the right of the arrow, write a brief description of the effect or outcome which results from the process.
- Draw a box around the description of the effect.



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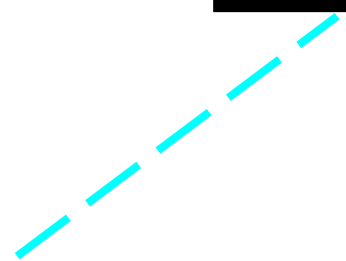
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Spine



**Inaccurate
Submission of
Billing to Client**

Effect Box



STEP 3:



Identify the main **CAUSES** contributing to the effect being studied.

- Establish main causes, or categories, under which other possible causes will be listed.
 - 3Ms and P – *Methods, Materials, Machinery,* and *People*
 - 4Ps – *Policies, Procedures, People,* and *Plant*
 - Environment

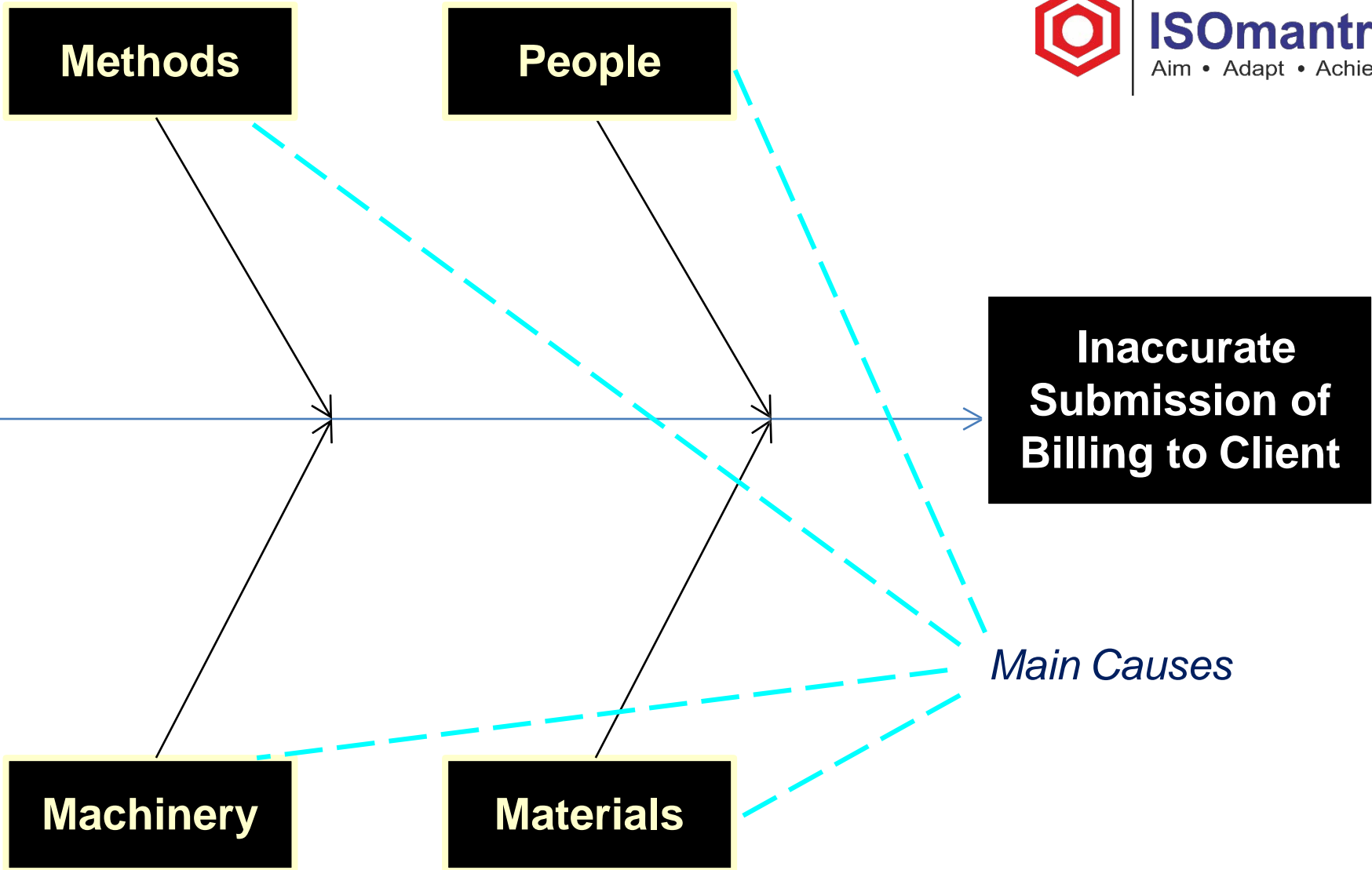
STEP 3:



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Identify the main CAUSES contributing to the effect being studied.

- Write the main categories your team has selected to the left of the effect box. Draw some above and below the spine.
- Draw a box around each category label and use a diagonal line to form a branch from the box to the spine.



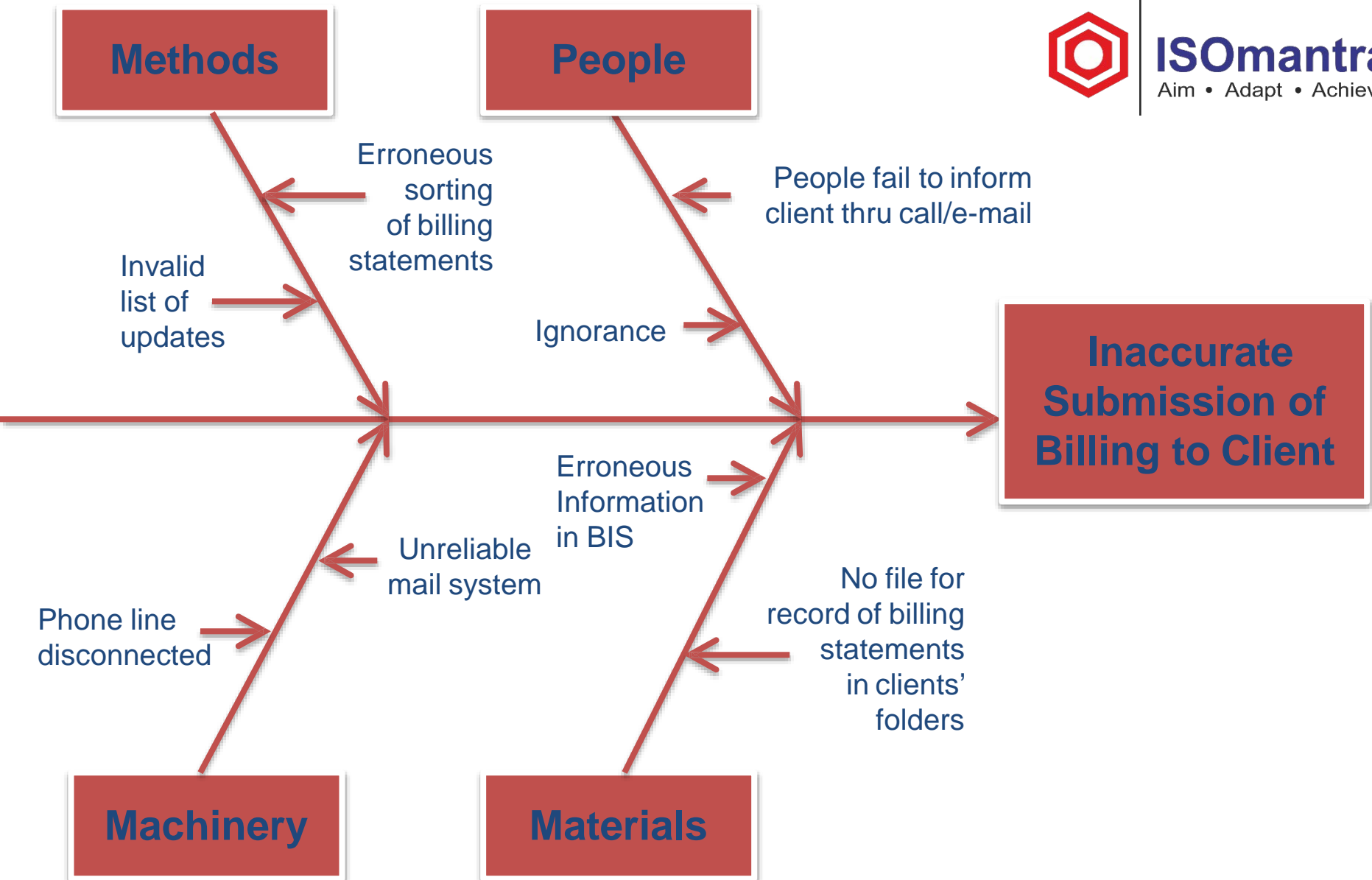
STEP 4:



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For each major branch, identify other specific factors which may be the CAUSES of the EFFECT.

- Identify as many factors or causes possible and attach them as sub-branches of the major branches.
- Fill in detail for each cause.



STEP 5:



Identify more detailed levels of causes and continue organizing them under related causes or categories.

- You can do this by asking a series of WHY questions**

FROM GIVEN EXAMPLE:

Q: Why is there an invalid list of updates?

A: Because the data was mixed up.

Q: Why was the data mixed up?

A: There was a problem with the manual organization of the files.

Q: Why is there a problem with the manual organization of the files?

A: Because there are no back-up files and since it was manually prearranged, inaccuracy is inevitable.



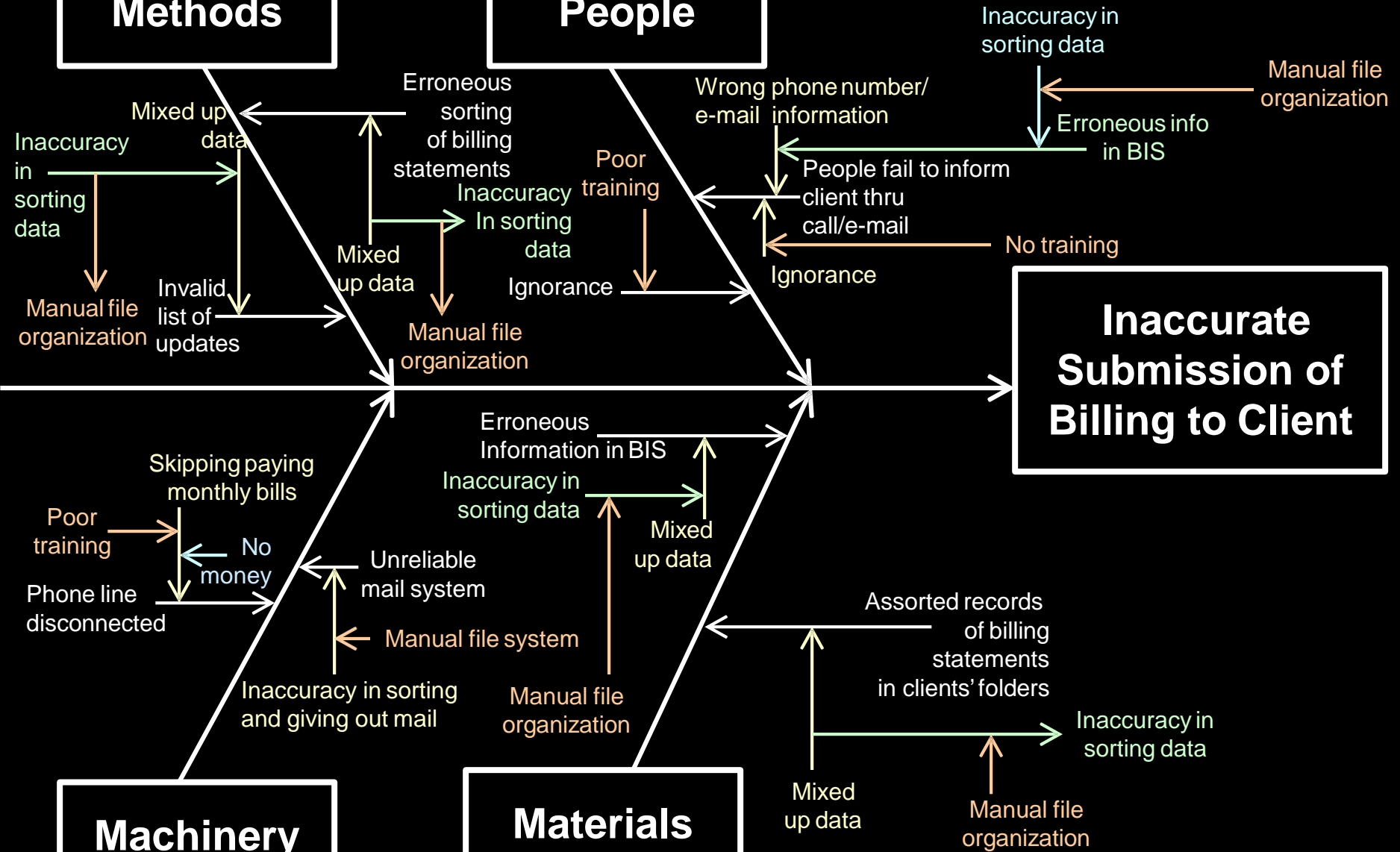
Methods

People

Machinery

Materials

Inaccurate Submission of Billing to Client



STEP 6:



Analyze the diagram

- It helps identify causes that warrant further investigation.
- Use a pareto chart to determine the cause to focus on first.
- See the “balance” of your diagram, checking for comparable levels of detail for most of the categories.

STEP 6:



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Analyze the diagram

- A thick cluster of items in one area may indicate a need for further study.
- A main category having only a few specific causes may indicate a need for further identification of causes.
- If several major branches have only a few sub-branches, you may need to combine them under a single category.

STEP 6:

Analyze the diagram

- Look for causes that appear repeatedly. These may represent root causes.
- Look for what you can measure in each cause so you can quantify the effects of any changes you make.
- Most importantly, identify and circle the causes that you can take action on.



Methods

People

Inaccuracy in sorting data

Manual file organization

Inaccuracy in sorting data

Manual file organization

Mixed up data

Invalid list of updates

Erroneous sorting of billing statements

Mixed up data

Manual file organization

Poor training

Inaccuracy in sorting data

Ignorance

Wrong phone number/ e-mail information

People fail to inform client thru call/e-mail

Not training

Ignorance

Inaccurate Submission of Billing to Client

Erroneous Information in BIS

Inaccuracy in sorting data

Mixed up data

Skipping paying monthly bills

No money

Unreliable mail system

Manual file system

Inaccuracy in sorting and giving out mail

Manual file organization

Assorted records of billing statements in clients' folders

Inaccuracy in sorting data

Mixed up data

Manual file organization

Machinery

Materials

Poor training

Phone line disconnected



Analyze

- The level of detail is well-balanced.
- The causes poor/no training and manual file organization/system are repeated several times.
- These causes stated above are the ones that should be attended to and given action on ASAP.



RECOMMENDED SOLUTIONS:

- Poor/No Training -> Give tutorials and seminars to new and old employees alike. Have people check employees' performances every once in a while.
- Manual File System -> Have a computer-based information system to maintain the organization. It will not only give you back-up files but make the system work faster. Make sure it is maintained and updated at all times.



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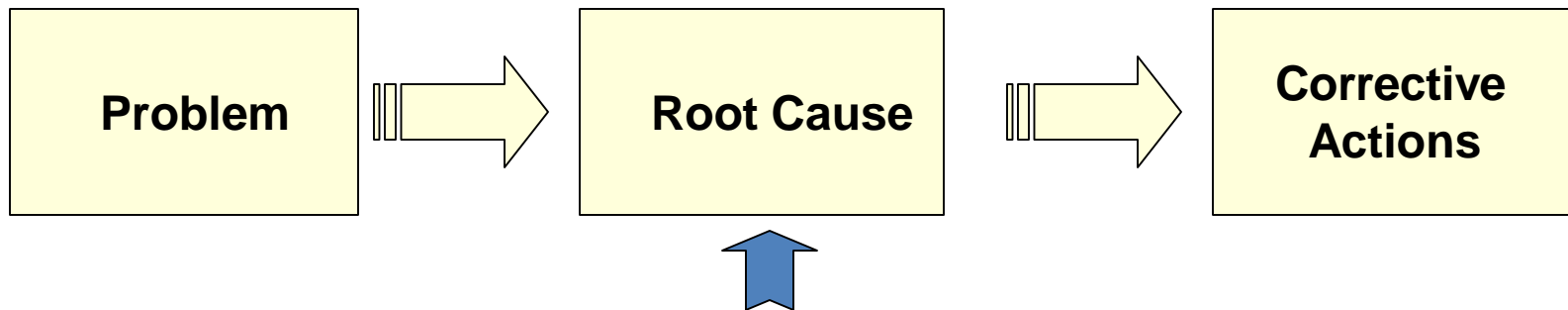
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5 Why's



Five Why's Preparation

Five why's is a Root Cause Analysis Tool. Not a problem solving technique. The outcome of a 5 Why's analysis is one or several root causes that ultimately identify the reason why a problem was originated. There are other similar tools as the ones mentioned below that can be used simultaneously with the 5 Why's to enhance the thought process and analysis.



Root Cause analysis Tools:

- Ishikawa Charts (Fish Bone)
- Design of Experiments
- Is / Is not Analysis
- **5 Why's**
- Cause & Effect Diagram.
- Statistical Data Analysis (Cpk, Pareto Charts, Anova, etc...)



Five Why's Preparation

- Any 5 Why's must address two different problems at the same time. The first part is related to the process that made the defective part.

("Why made?")



- The second one must address the detection system that was not able to detect the defective part before it became a problem. The lack of detection of a defective product is a problem of its own and must be treated independently than the product problem itself.

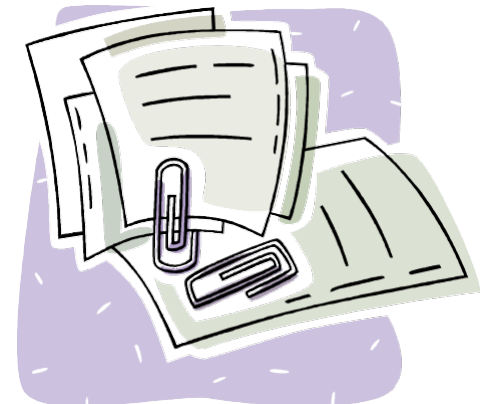
("Why not detected?")





Five Why's Preparation

- **Even though the discipline is called 5 Why's is not always necessary to reach 5 before the root cause of a problem is fully explained; or it may take more than 5 why's to get to the bottom of it. It will depend on the complexity of the process or the problem itself.**
- **In any case, 5 has been determined, as a rule of thumb, as the number at which most root causes are clearly identified. Do not worry about not meeting or exceeding this number though. Just follow your thought process and let it decide how many Why's you require to get to the point where the root cause is evident.**





For all the Five Why's:

Ask the full question including the problem or cause behind it. If there is a problem

with labeling ask:

- **“Why the parts were labeled incorrectly?”** If the answer is unreliable
database ask:

- **“Why is the database unreliable?”**

If we do not follow this approach answers to the why's tend to lose focus on the third or fourth why.



Five Why's Preparation

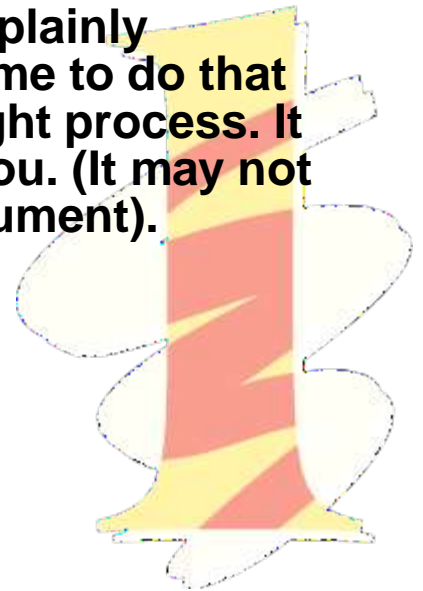
- It is said that a well defined problem is a half resolved problem; hence it is important to state the problem as clearly as possible.
- Whenever possible define the problem in terms of the requirements that are not being met. This will add a reference to the condition that should be and is not.





Five Why's – The First Why

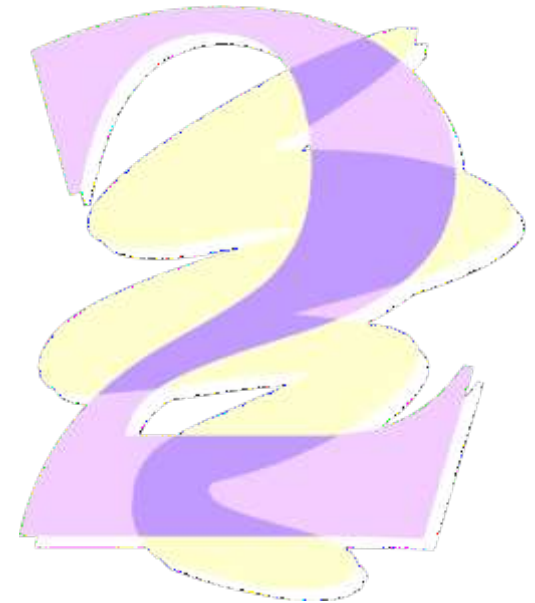
- **Clear statement of the reason for the defect or failure to occur, understood even by people that is not familiar with the operation where the problem took place.**
- **Often this 1st Why must be a short, concise sentence that plainly explains the reason. Do not try to justify it, there will be time to do that later on in the following why's if it is pertinent to the thought process. It is Okay to write it down even if it seems too obvious for you. (It may not seem that obvious to other persons that will read the document).**





Five Why's – The Second Why

- **A more concise explanation to support the first statement.**
- **Get into the technical arena, the explanation can branch out to several different root causes here. It is OK to follow each of them continuing with their own set of remaining 3 why's and so forth.**





Five Why's – The Third Why

- Do not jump to conclusions yet, follow the regular thought process even though some underlying root causes may start surfacing already.
- This 3rd why is critical for a successful transition between the obvious and the not so obvious. The first two why's have prepared you to focus on the area where the problem could have been originated; the last three why's will take you to a deeper comprehension of the problem. Visualize the process where the product went through (process mapping) and narrow down the most likely sources for the problem to occur.
- You do not need to answer all the why's at the same time, it is an investigation activity and it will sometimes require you to go to the process and see things you could have missed at first.
- You may be missing the obvious by rushing into “logical” explanations”.

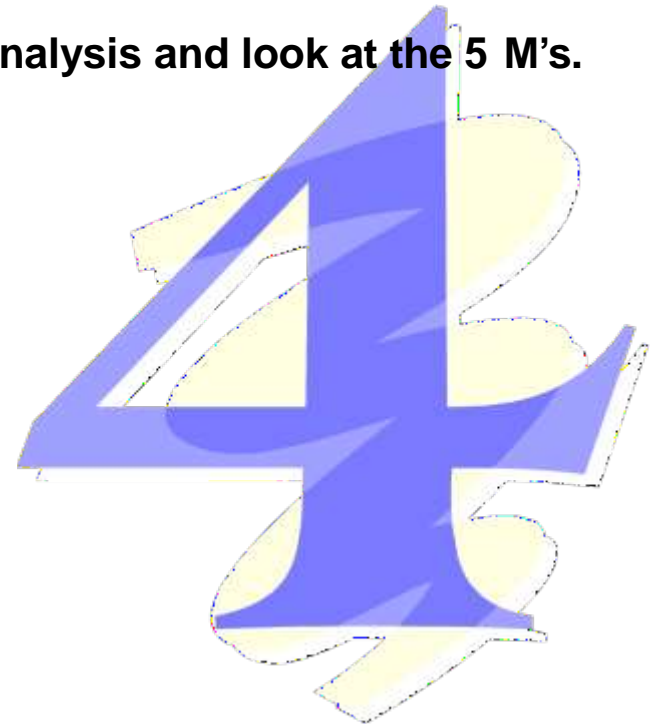


Five Why's – The Fourth Why

•Clear your mind from preconceived explanations and start the fourth why with a candid approach. You may have two or more different avenues to explore now, explore them all. Even if one or several of them turn out not to be the root cause of the problem, they may lead to continuous improvements.

This is a good time to include a Cause and Effect analysis and look at the 5 M's.

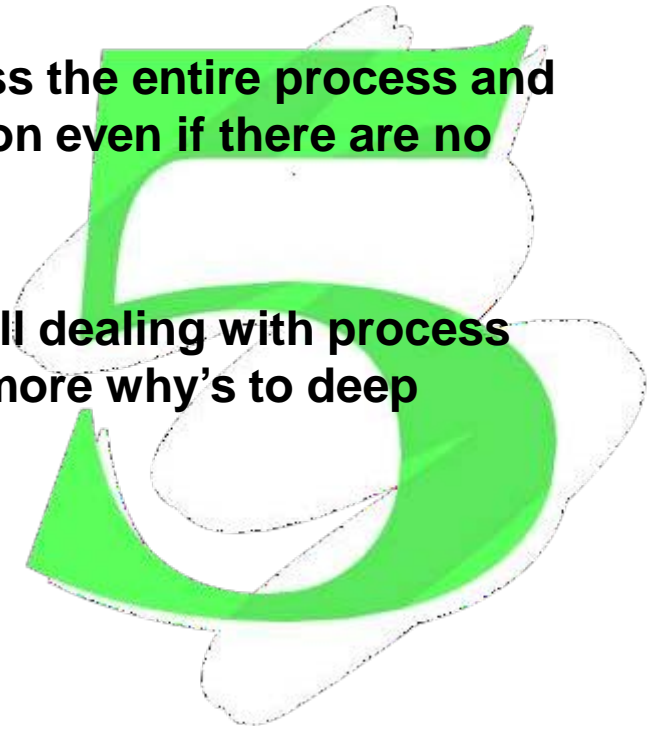
- ❖ **Method**
 - ❖ **Materials**
 - ❖ **Manning**
 - ❖ **Machines**
 - ❖ **Mother Nature**





Five Why's – The Fifth Why

- When you finally get to the fifth why, it is likely that you have found a systemic cause. Most of the problems in the process can be traced to them. Even a malfunctioning machine can sometimes be caused by an incorrectly followed Preventive Maintenance or Incorrect machine parameters setup.
- When you address a systemic cause, do it across the entire process and detect areas that may be under the same situation even if there are no reported issues yet.
- If you have reached the fifth why and you are still dealing with process related cause(s), you may still need one or two more why's to deep dive into the systemic cause.





Five Why's – Conclusion

•A good way to identify if the 5 Why's was done properly is to try to organize the collected data in one sentence and define it in an understandable manner. If this cannot be done or the sentence is fragmented or meaningless chances are that there is gap between one or several of the why's. You then must revisit the 5 Why and identify those gaps to fill them in. If there is coherence in the way that the sentence is assembled, it shows consistency on the thought process.

•Something like:

“Problem Description” occurred due to “Fifth Why”. This was caused by “Fourth why” mainly because “Third Why” was allowed by “Second why”, and this led to “First Why”.





Five Why's – Conclusion

- Do not forget that the sought outcome of a 5 Why exercise is a root cause of a the defined problem, not the resolution of the problem itself; that will come later. 5 Why's is not a standalone Problem Solving technique but more of a tool to aid in this process.
- Do not worry about Action plans and effectiveness verification yet as that will be addressed in the 8D; but focus more on identifying the reason that allowed the problem to happen and escape. If you can come up with a reasonable answer, the 5 Why's exercise would be successful. If it cannot be done, then quite probably more data needs to be collected to get a better grip of the problem and then the 5 Why process can be re-started.





Five Why's – Conclusion

- One final point to ponder:

**A PROBLEM THAT CANNOT BE REPRODUCED IS A PROBLEM THAT HAS NOT BEEN RESOLVED YET.
BEEN RESOLVED YET.**

- Challenge the root cause(s) that resulted from the 5 Why's exercise to try to reproduce the defect. If you cannot there is a very big chance that you have not gotten to the bottom of it yet. If you do reproduce them, move on to the Corrective Action part and congratulate your team for a job well done.

