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A REVIEW ON: FISHBONE DIAGRAM

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ABSTRACT

The Fishbone Diagramis a tool that helps identify, sort and display possible causes of a specific problem or quality characteristic. So this Cause and Effect Diagram referred to as the "Ishikawa diagram," and the "fishbone diagram," because the complete diagram resembles a fish skeleton.The diagram illustrates the main causes and subcauses leading to an effect (symptom). It is a team brainstorming tool used to identify potential root causes to problems. In a typical Fishbone diagram, the effect is usually a problem needs to be resolved, and is placed at the "fish head". The causes of the effect are then laid out along the "bones", and classified into different types along the branches. Further causes can be laid out alongside further side branches.

KEYWORDS: Fishbone Diagram, Cause and Effect Diagram, Root Cause Analysis.

INTRODUCTION

History of Fishbone diagram- Ishikawa diagrams were proposed by Kaoru Ishikawa in the 1960s,who pioneered quality management processes in the Kawasaki shipyards and in the process became one of the founding fathers of modern management[1] .It was first used in the 1960s,and is considered one of the seven basic tools of quality management,[1] along with the histogram, Paretochart, check sheet, control chart, flowchart and scatter diagram., It is known as a fishbone diagram because of its shape,similar to side view of a fish skeleton.

What is Cause and Effect Diagram?

A Cause and Effect Diagram is a tool that is useful for identifying and organizing the known or possible causes of quality, or the lack of it. The structure provided by the diagram helps

team members think in a very systematic way, It called Ishikawa diagram or a Fishbone diagram because of the way it's looks.

The fishbone diagram is a cause and effect diagram that can be used to identify the potential or actual cause for a performance problem.Fishbone diagrams provide a structure for a group's discussion around the potential causes of the problem.[3]

Graphically illustrates the relationship between a given outcome and all the factors that influence this outcome.Sometimes called an Ishikawa or fishbone diagram,it helps show that relationship of the parts (and subparts) to the whole by;

1. Determining the factors that cause a positive or negative outcome(or effect)
2. Determining the root causes of a given effect
3. Focussing on a specific issue without resorting to complaints and irrelevant
4. Identifying areas where there is a lack of data.

Advantages

- Helps determine root causes
- Uses an orderly, easy-to-format
- By using a fishbone diagram, you are able to focus the group on the big picture as to possible causes or factors influencing the problem or need.[3]
- Even after the need has been addressed, the fishbone diagram shows areas of weakness that once exposed can be rectified before causing more sustained difficulties.
- Encourages group participation
- Indicates possible causes of variation
- Increases process knowledge
- Identifies areas for collecting data.

Disadvantages

- As a weakness, the simplicity of the fishbone diagram may make it difficult to represent the truly interrelated nature of problems and causes in some very complex situations.[3]
- Unless you have an extremely large space on which to draw and develop the fishbone diagram, you may find that you are not able to explore the cause and effect relationships in as much detail as you would like to.[3]

DESCRIPTION

Appearance

A generic Ishikawa diagrams have a box at the right hand side, where the effect to be examined is written. The main body of the diagram is a horizontal line from which stem the general causes, represented as "bones". These are drawn towards the left-hand side of the paper and are each labeled with the causes to be investigated often brainstormed before hand.[1]

Off each of the large bones there may be smaller bones highlighting more specific aspects of a cetaincause, and sometimes there may be a third level of bones or more.[1]

These can be found using the 5 Whys technique. When the most probable causes have been identified, they are written in the box along with the original effect. The more populated bones generally outline more influential factors, with the opposite applying to bones with fewer"branches". Further analysis of the diagram can be achieved with a paretochart. The fishbone concept can also be documented and analysed through depiction in a matrix format.[1]

Common categories in Fishbone diagram

The M's (Manufacturing industry)	The P's (In Marketing industry)	The S's (In Service Industry)
Machine(Equipement)	Plant /Place	Surroundings
Method(Process)	Promotion	Supplies
Man Power(People)	People	Systems
Material	Positioning	Skills
Mother Nature(Environment)	Procedures	Safety
Management (Policies)	Price	
Measurement(Inspection)	Product	
Maintenance		
Marketing(Promotion)		

GENERAL PROCEDURES

The steps for constructing and analyzing a Fishbone Diagram:

Step 1-Identify and clearly define the outcome to be evaluated

Formulate the problem and write it in a box on the right side of the diagram.Everyone must clearly understand the nature of the problem and process/product being discussed.[5,6,7,8]

If everyone is not clear on the purpose of the session will not resolve the problem.In this step the following rules have to be applied:

1) Decide on the effect to be exmined.Effects are stated as particular quality characteristics, problems resulting from work, planning objectives,and the like.

2) Use Operational Defination. Develop an operational Defination of the effect to ensure that it is clearly understood.

3) Remember, an effect may be positive(an objective)or (a problem),depending upon the issue that's being discussed.

You must decide which approach will work best with your group that will be-

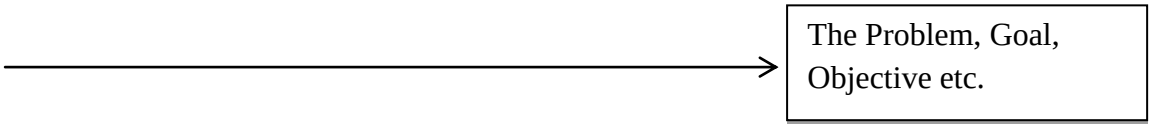
- Using a positive effect which focuses on a desired outcome tends to faster pride and ownership over productive areas.
- Focusinng on a negative effect can sidetrack the team into justifying why the problem occurred and placing blame.

Step 2-Use a chart pack positioned so that everyone can see it ,draw the spine and create the effect box.[5,6,7,8]

1) Draw a horizontal arrow pointing to the right. This is the spine.

2) To the right of the arrow, write a brief description of the effect or outcome which results from the process.

3) Draw a box around the description of the effect. It is shown in below.

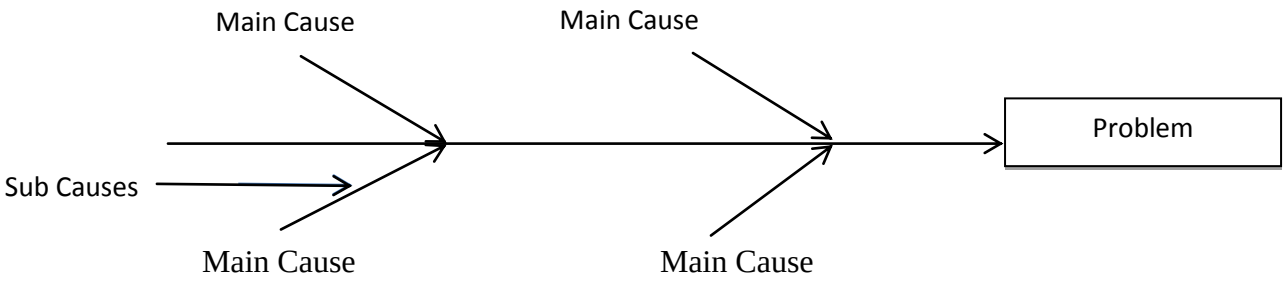


Step 3-Identify the main causes contributing to the effect being studied.These are the labels for the major branches of your diagram and become categories under which to list the many causes related to those categories.

1) Establish the major causes,or categories under which other possible causes will be listed. You should use category labels that make sense for the diagram you are creating.

2) Write the main categories your team has selected to the left of the effect box,some above the spine and some below it.

3) Draw a box around each category label and use a diagonal line to form a branch connecting the box to the spine. It is shown in below.[5,6,7,8]



Step 4-For each major branch, identify other specific factors which may be the causes of the effect

1) Identify as many causes or factorsas possible and attach them as subbranches of the major branches.

2) Fill in detail for each cause.If a minor cause applies to more than one major cause ,list it under both.

Step 5-

Identify more incresingly more detailed levels of the causes and continue organising them under related causes or categories.You can do this by asking a series of why questions.[5,6,7,8]

You may need to break your diagram into smaller diagrams if one branch has too many subbranches.Any main cause (3Ms and P or a category you have named)can be reworded into an effect.

Step 6-

Analyze the diagram.Analysis helps you identify causes that warrant further investigation. Since Cause-and-Effect Diagrams identify only possible causes,you may want to use a Pareto Chart to help your team determine the causes to focus on first.[5,6,7,8]

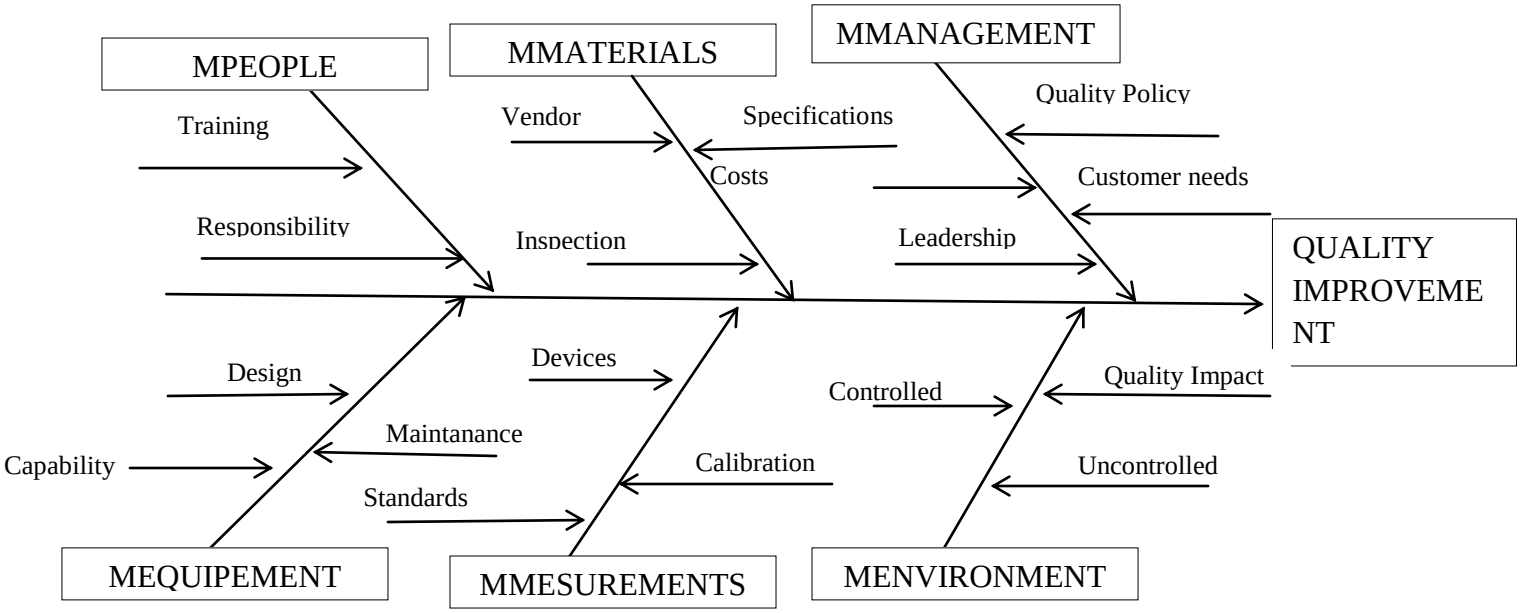
Look at the balance of your diagram ,checking for comparable levels of details for most of the categories.

- 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 subbranches ,you may need to combine them under a single category.

- Look for causes that appear repeatedly.These may represent root causes.
- Look for what you canmeasure in each cause so you can quatify the effects of any changes you make.

Example of Fishbone Diagram



TIPS FOR SUCCSS

Make parsimonious use of words while populating the Diagram, So use as many words as necessary to discribe.[3]

Make sure that there is consensus in the group about both the need and the characteristics of the "cause statement" before beginning the process of building the diagram, If appropriate then you can graft branches that do not contain a lot of information onto other branches, Likewise you can split branches that have too much information into two or more branches as you go.[3]

CONCLUSION

This diagram is of resembles the skeleton of a fish,it also focus on causes rather than symptoms of a problem and This diagram emphasizes group communication and brainstorming and mainly stimulates discussion.

The Cause Mapping approach builds upon and refines some of the fishbone diagrams original concepts. The concepts, example and exercises involved with Cause Mapping improve the way people analyze, document, communicate and solve problems. The purpose of an investigation is to find the best solutions to prevent an incident from occurring, and a Cause Map helps reach this ideal by efficiently laying out on one map-the organisationsgoals, problems and the systems of evidence supported causes. So this Diagram helps to determine the root causes of a problem or Quality characteristic, Encourages group participation and increase the knowledge of process.

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