



USING FISHBONE DIAGRAMS AS PROBLEM SOLVING TOOLS

The Fishbone Diagram is a graphic tool that can help factories and other organisations to solve problems by conducting an analysis of a situation in a diagram that looks like a fishbone. The Fishbone Diagram is also known as the Ishikawa diagram after the Japanese quality management expert who created it.

PROSPECTIVE USERS:

Any factory team that:

- Needs to study a problem/issue to determine the root cause
- Wants to study all the possible reasons why a process is beginning to have difficulties, problems or breakdowns
- Needs to identify areas for data collection
- Wants to study why a process is not performing properly or producing the desired results.

PROBLEM ADDRESSED

The Fishbone Diagram helps you to identify, sort, display and analyse possible causes of a specific problem.

PROCESS

The Fishbone Diagram can be used by individuals or teams; probably most effectively by a group of people. It involves the drawing of a diagram on a chalkboard or flipchart by a team leader who first presents the main problem that needs to be examined. The team leader then asks for assistance from the group to determine the main causes. These causes are subsequently drawn in the diagram on the board.

The team assists by making suggestions and, eventually, the entire Fishbone Diagram is filled out. Once the fishbone is complete, team discussions takes place to decide what are the most likely root causes of the problem. These causes are highlighted to indicate items that should be acted upon, and the use of the tool is complete.

The Fishbone Diagram can help you to see very clearly the reasons why a situation or problem exists by listing all the factors that influence it. It is also possible to identify solutions that may help solve more than one problem. While carrying out this analysis, you may make further discoveries that will also help you remove other blocks.

Steps in implementation

The basic steps in a chronological sequence are:

- (i) Decide on the problem to be examined and write it down. Try to be as specific and precise as possible.
- (ii) Define the characteristics of the problem and make it the “backbone” of the fish.
- (iii) Decide on the main causes of the problem. You can divide the causes into categories, e.g. workers, machine, material, method etc. Assign one “large bone” coming off the backbone of the fish to each category.
- (iv) For each main cause, think of an area that contributes to the problem e.g. lack of training might be a main cause in the workers category. Write these on the horizontal lines – the “middle bones” – that run out from the large bones.
- (v) Analyse and define secondary causes and add them as “small bones”.
- (vi) For each cause, ask why does this happen? If there is another reason, include it on a branch of the horizontal line for that cause: e.g. why is there a lack of training? The answer may be a lack of funding. This should then be added to the diagram.
- (vii) The Fishbone Diagram should then help you to see the larger problem more clearly and identify the smaller problems that contribute to the larger ones.
- (viii) When such a check has been carried out, it is possible to look back with a sharper eye at the whole factory process and observe how much extra work is required and how much extra time is wasted when due to the cumulative effect of design faults, ineffective production methods, poor management of the process and below standard work by the worker.

Figure 1. How to draw a Fishbone Diagram

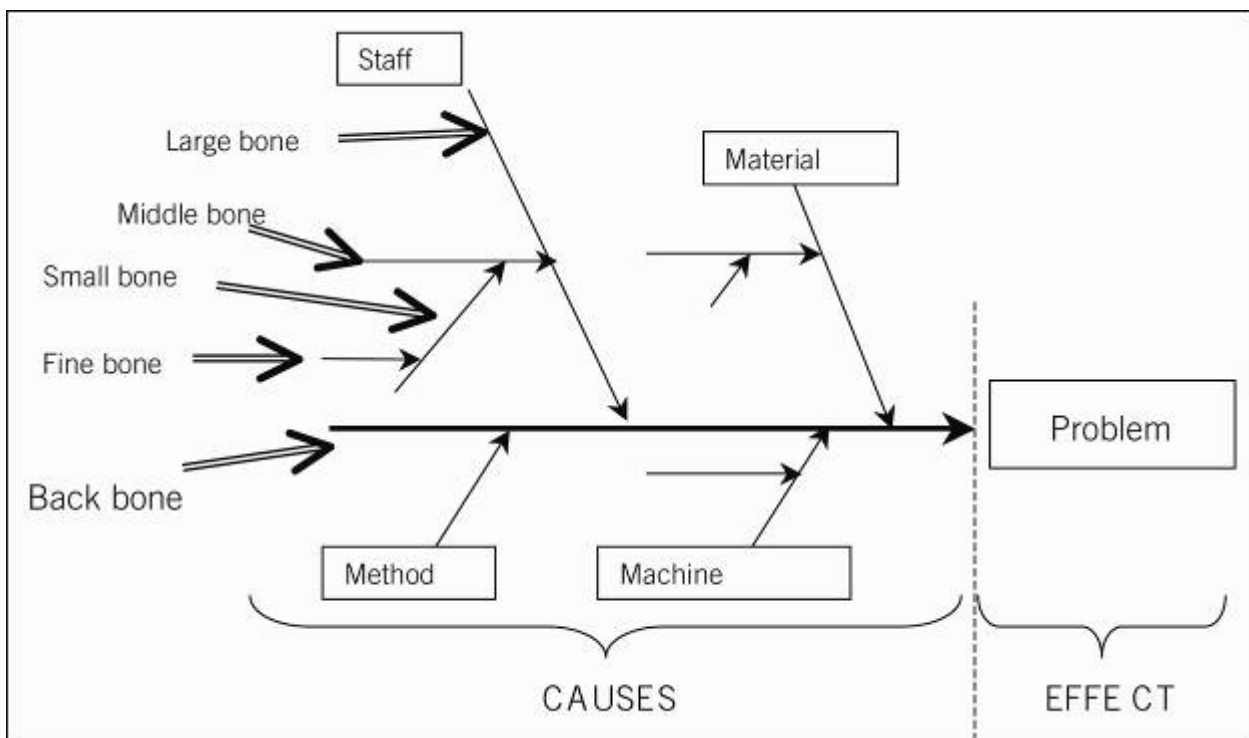
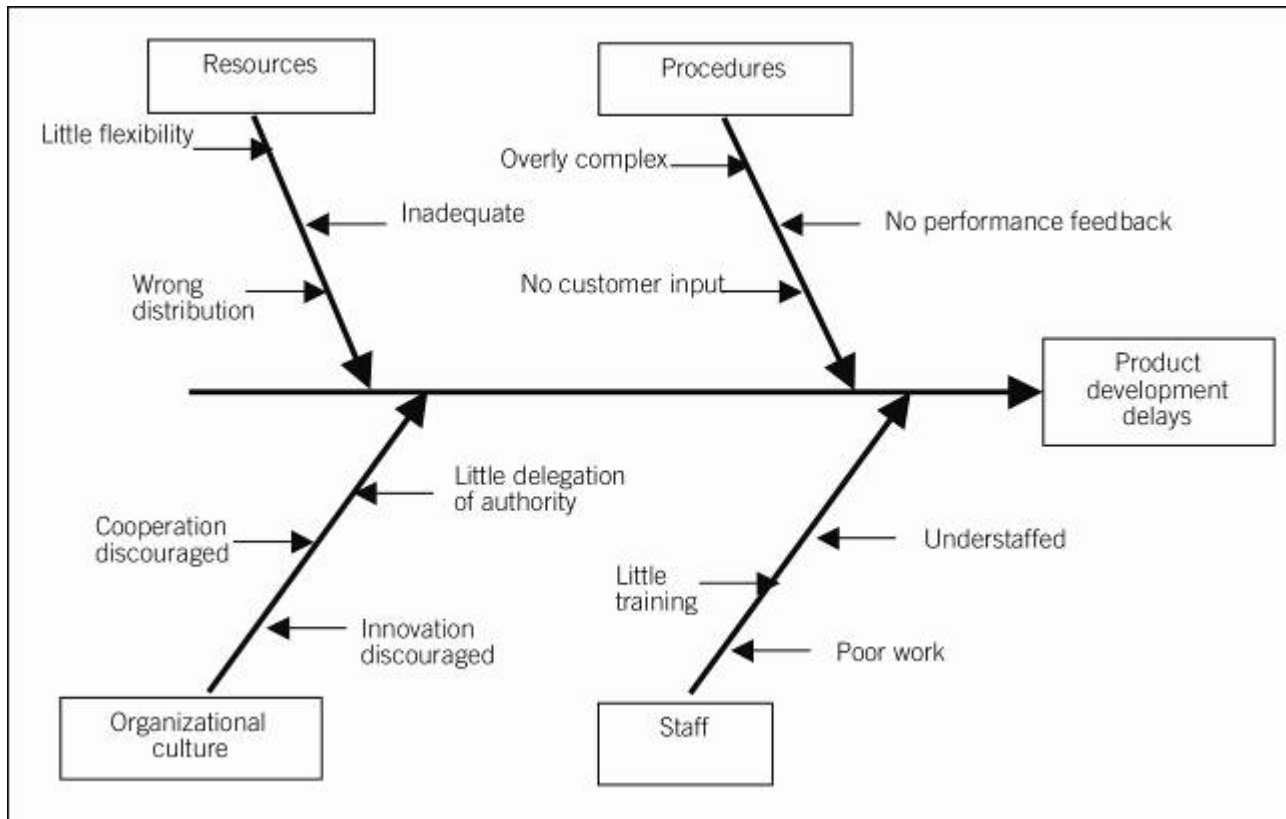


Figure 2. Example of Fishbone Diagram to establish the cause and effect of delays in product development



RESOURCES REQUIRED

Fishbone Diagrams are usually constructed using brainstorming techniques. Brainstorming, or going through the above steps with a group of people, is in itself a very valuable exercise to bring members of a team together to focus on a common problem. The resources required for using Fishbone Diagrams as a problem solving tool therefore include time allocated to the exercise by a team of workers who will act as the brainstorm group.

In addition you will need drawing materials such a big flipchart or large sheets of paper, masking tape, flipchart markers or pens, and the brainstorm ideas.

No financial resources or prior training are necessary.

POSITIVE IMPACT

The structure provided by Fishbone Diagrams helps team members think in a very systematic way. Their major benefit is that they push you to consider all possible causes of the problem, rather than just the ones that are most obvious. Some of the benefits of constructing Fishbone Diagrams are that they:

- Help determine the root causes of a problem or quality characteristic using a structured approach.
- Encourage group participation and utilize group knowledge of the process.
- Use an orderly, easy-to-read format to illustrate cause-and-effect relationships.
- Indicate possible causes of variation in a process.

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

CHALLENGES AND PITFALLS

Fishbone Diagrams with only a few factors or “bones”, while looking neat and well ordered, may well reflect a lack of knowledge of the situation, or show that the effort to draw the diagram was not creative and exhaustive enough. A good Fishbone Diagram is one which explores all possibilities so it is often large and

complex-looking as factors multiply for each new related idea noted down.

INDICATORS FOR MONITORING

It is important to monitor the outcome of the Fishbone Diagram building exercise by ensuring that effective measures are taken to tackle and resolve the problems that have been identified. Furthermore, building a Fishbone Diagram does not have to be a one-off exercise. The diagram is often used as a working document that is updated as and when more data has been collected and when various solutions have been tried.

Further Information Available:

FIP References:

Module 2 - Quality

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