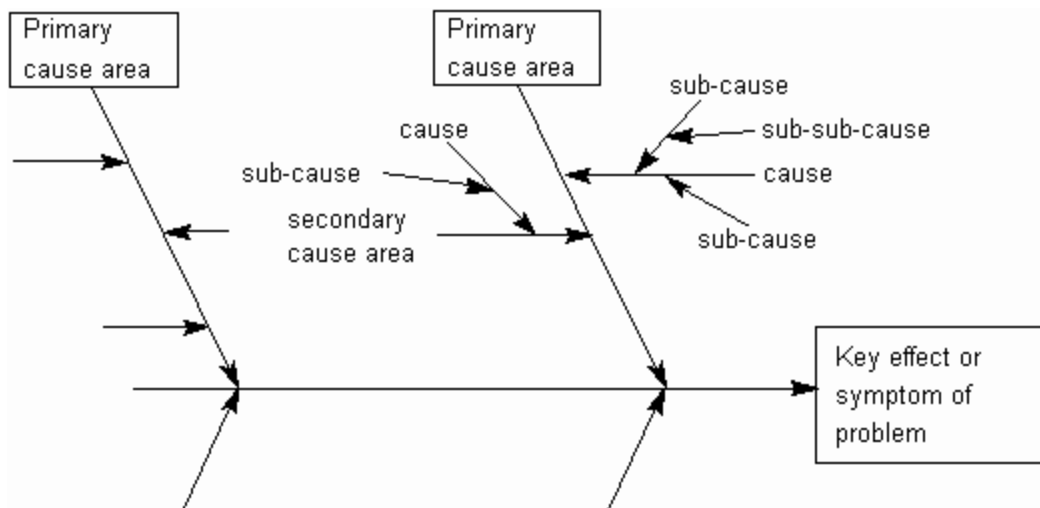


## Cause-Effect diagram (Fishbone Diagram)

The basic idea of Cause-Effect diagrams is simply identifying the causes for a certain effect. A lot of times it is difficult to find the problem of a solution and this diagram gives a help to this specific issue. Sometimes an identified cause may not be the root of the problem which means that although a cause is found it does not really solve the original problem. One example is when an accident is caused by a puncture. The puncture gets fixed but the same thing happens again and again because the real cause is not discovered. The cause could have been a weak tire wall or a rough road for example. Then it is those causes that need to be worked with. To work with the Cause-Effect diagram the tool of Brainstorming is an efficient work tool.

The layout of the Cause-Effect diagram is as shown below:



Lines are added that may have caused the problem or the symptom of the problem. If another cause has relations with a certain line (a certain cause) it can be added as another line pointing to the effected line. Each line is either a cause area or a named cause. The difference between those two definitions is that a cause area is not a specific cause but it can contain causes. To go back to the example of the punctured tire. A smooth or punctured tire can be a cause. Cause areas are most of the times nouns, while causes normally are verbs.

*The Root causes* are the ones at the ends of the different chains of causes that does not have any sub-causes.

### **WHEN TO USE IT**

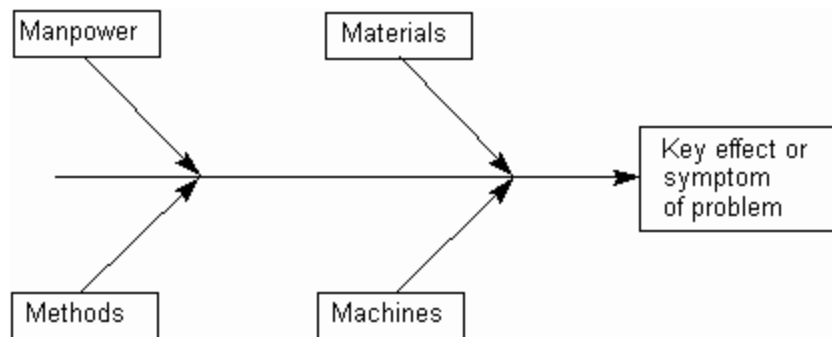
It can be used in several different ways as a help-tool within the area of Quality Management. The different situations when to use it are the following:

- Investigating a problem:  
*you identify and select the key problem causes to investigate or address.*
- When you are aware and know of the primary symptom or effect of a problem and all the causes are not known

- It can be used very efficient to gain a common understanding of problem causes and their relationship with each other, when working in group
- It can also be used to find other causal relationships such as potential risks or causes of desired effects.
- You can use it as a preference to a Relations Diagram where there is one problem and causes are mostly hierarchical (this will be most cases)

## HOW TO USE IT

1. Form a small team of people to work on the problem. The people should have different knowledges and skills to give a group with wide knowledge. Define the key symptom or effect of the problem under scrutiny. The key problem should be expressed very brief and clear, for example: 'Low sales of MkII Costor'.
2. Write down the key effect or symptom at the center-right of the page (or whiteboard or flipchart, if you are doing it in a group), and draw a spine horizontally from it to the left.
3. Draw the main cause area 'ribs', one for each of what appears to be the primary cause areas. If these are uncertain, then the 'Four Ms' (Manpower, Methods, Machines and Materials) provide a good starting point, as illustrated in Fig. 1. In these gender-free days, an exact alternative is the four Ps (People, Processes, Plant and Parts).



**Fig. 1. The default 'Four Ms'**

4. After that you can use Brainstorming to follow building up the diagram, adding causes or cause areas to the affected ribs or sub-ribs. A simple key-question in this session is "Why?" to every identified cause. If the same cause is identified in several different causes is to be shown clearly in the diagram as below.
5. Continue with discussing why the found causes are in the diagram. Key causes that require further attention are to be circled. You should not have many key causes, since this can lead to defocused activities. If there is no clear agreement, use a Voting system.
6. Consider the key causes again and analyse their importance against each other. If anyone is more important than others, put a second circle around them, or put numbers next to them to show their relative priority.
7. If necessary, gather data to confirm key causes are real, and not just assumed. Repeat the process as necessary.
8. Plan and implement actions to address key causes.

### **HOW TO IMPROVE THE SLIDES OF THIS SAME TOPIC**

The slides are more simple than the description in the web. This makes the slides more easy to understand and it grasps the main idea better than the one described in "The Quality Toolbox" where it very fast goes very deep into how to make the Cause-Effect diagram.

However, what may be missing in the slides is the practical usage of the diagram such as in which different forms it can be used (the part "WHEN TO USE IT" in this document). It can be could to see that it is not only used for in area but in five, for example to identify potential risks.