In this article we will review a few brainstorm techniques that are very powerful in the problem solving process. These tools apply brainstorming within the team. During the brainstorming process criticism of ideas is not allowed. 'Out-of-the-box' thinking is important to generate as many ideas as possible. Causes or ideas need not necessarily supported by data or facts. Brainstorming is an idea generation process. Verification will be done later on.

Brainstorm Techniques

Brainstorm techniques are creative processes used by teams to produce lots of possible ideas (the trivial many) in response to a single question or statement prior to then prioritizing the most likely results (the trivial few). Brainstorming can be used at many different stages in the process improvement project: to develop ideas for CTQs; to identify helpful measures; to record all the potential causes or to generate lots of possible solutions.

It is advisable to facilitate the brainstorming in two phases: an opening phase of silent individual brainstorming reduces the likelihood of a dominant or senior member of the team inadvertently leading the team down a single train of thought (group think); a summarizing stage that involves the whole team can then be used to share, capture and group the ideas and simultaneously encourage the synergetic process that produces innovative spin off ideas. 'Multivoting' can be used when multiple people are involved in the decision making process. It helps whittle down a large list of options to one decision.

Three common brainstorm techniques are:

- Affinity diagram
- 5-Whys method
- Cause & Effect diagram (Ishikawa)

1. Affinity diagram

The Affinity diagram is a brainstorm tool used to organize causes or ideas. It is one of the Basic Management and Planning Tools. The 'Affinity diagram' technique, was devised by Kawakita in the 1960s.

The technique is often used within problem solving projects to create an overview after a brainstorm session about possible root causes or improvement suggestions. This is done by clustering items that are similar or can be combined in a certain way. The best results will be achieved when the session is performed by a cross-functional team.
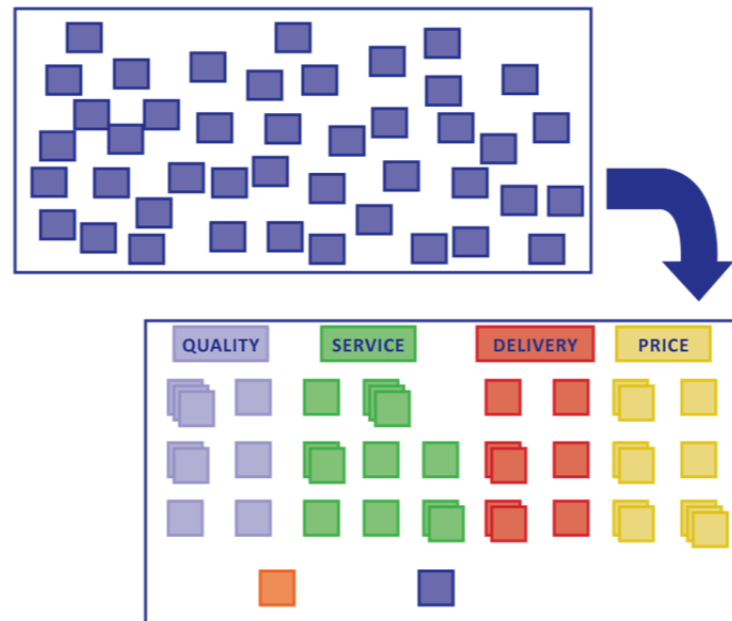
In a problem solving session, the Affinity diagram follows these steps:

- Each team member receives a bundle of post-Its.
- Each team member writes suspected causes on post-Its.
- The causes will be pasted on the wall.
- Post-Its will be sorted into clusters when they are related or similar.
- Common headlines will be defined for each cluster.

Sometimes headlines will be defined before the brainstorm session starts (step 5 will be put after step 1).

2. 5-Whys method

The 5-Whys is an iterative question-asking technique used to explore the Cause-and-Effect relationships underlying a particular problem. The primary goal of the technique is to determine the root cause of a defect or problem.

The technique was originally developed by Sakichi Toyoda and incorporated in the Toyota Production System. Today the 5-Whys has seen widespread use beyond Toyota. It is used within Kaizen, 8D problem solving (step D4), Lean manufacturing and Six Sigma improvement programs. The 5-Whys has to answer three questions which are visualized in a 'Tree diagram'.

A. Why did the problem occur?
B. Why was the problem not detected earlier?
C. Why did the 'System' not function?
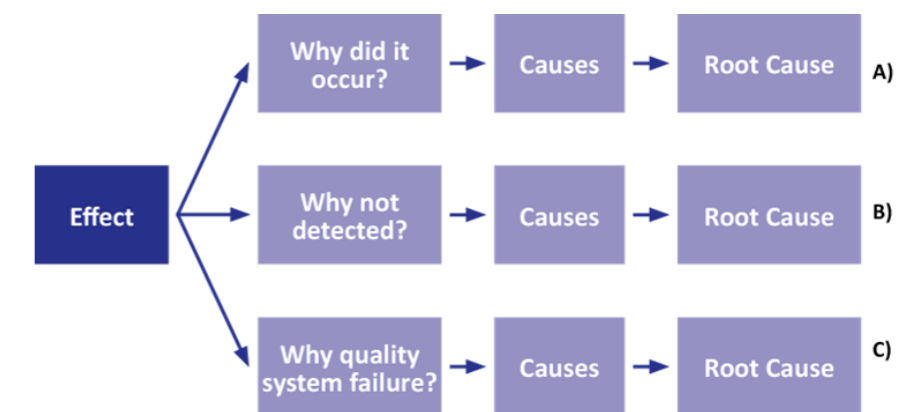
It is not strictly necessary to answer all three questions. For instance, there is no need to move on to B and C if the problem was caught by the operator due to the correct functioning of the Quality System! It is also not strictly necessary to ask exactly five times 'Why?' to each question. Each answer to the question 'Why?' needs to be relevant, controllable and significant. The root cause can be recognized when the answer is a process or policy or person. If the 5-Whys ends with a person then great care needs to be taken NOT to apportion blame. People do make mistakes but there are many ways to reduce how many mistakes a person might make. So the next line of questioning should be to find a solution that aids the person: Is new training needed? Can the mistake be prevented with Poka Yoke?

3. Ishikawa diagram

The purpose of the Ishikawa diagram is to collect possible Causes for a certain Effect by conducting a brainstorm session. In most cases the Effect is a failure mode or problem statement. Kaoru Ishikawa (1968) created this type of graphical visualization. The Ishikawa diagram is also known as the Fishbone or Cause & Effect diagram. Fishbone refers to the graphical shape of the diagram, because it looks like a fish.

Causes can be derived by performing a brainstorming session with a group of people. The outcome of this brainstorm session is often enlightening but also depends very much on the people who participate in the session. To facilitate the thinking process of the attendees, six major groups of causes have been determined. These are called the 6 Ms. The group should focus on one M at a time to identify as many as possible potential causes within that group.

♦ Manufacturing: Technology or equipment related causes.

♦ Method: Process related causes.

♦ Material: Raw Material or information

♦ Man: Causes related to people or employees.

♦ Measurement: Causes related to measurement tools or inspection methods.

♦ Mother Nature: Environmental causes.
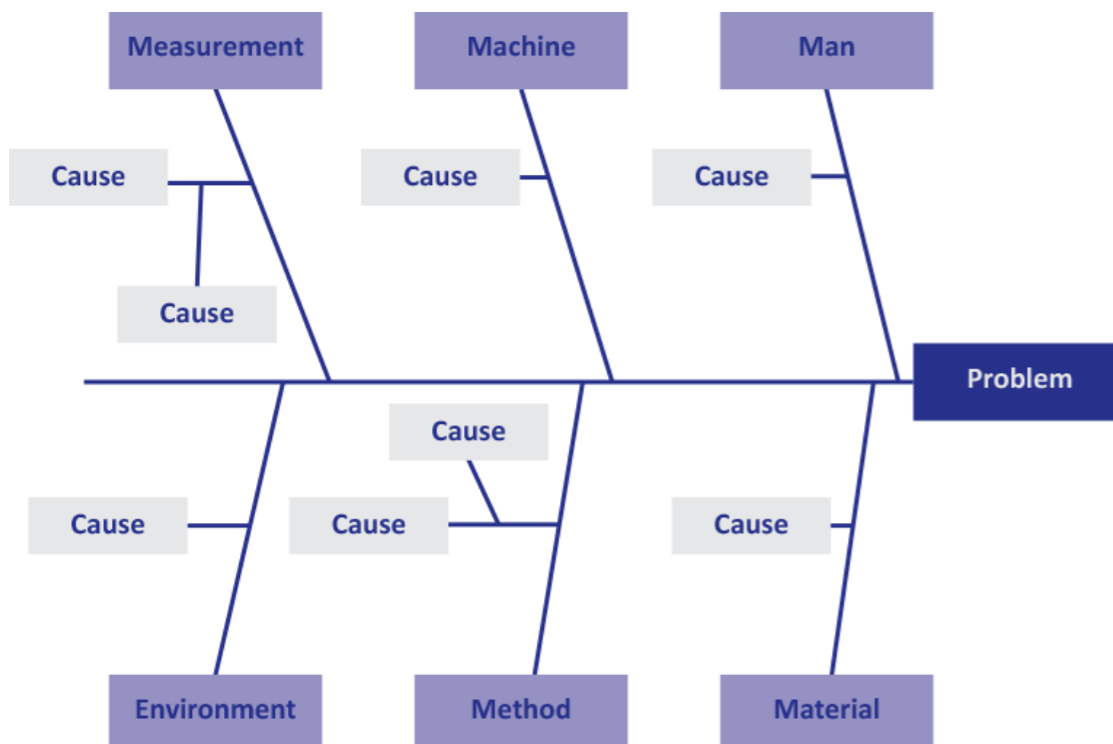
In the first phase of the brainstorm session, as many potential causes as possible per major group will be collected. Of course not all these potential causes will be the actual or significant cause of the effect. Therefore a second round is needed to group causes and to highlight the causes that are highly suspected. At the end of this second round the result should be a limited number of potential causes that need further investigation.

About the Lean Six Sigma Academy

Lean Six Sigma Academy (LSSA) is the Scheme Owner of Lean Six Sigma. LSSA has designed the training and certification standards for Lean Six Sigma and has developed a series of training materials, including books, presentations, syllabi and exams. The materials are widely used by training organizations, universities and individuals to learn Lean Six Sigma.

Being an open, professional and quality driven Lean Six Sigma knowledge Community, LSSA supports the development of training, curriculum and certification of Lean Six Sigma in various branches. LSSA intends to provide the "one stop shop" service to the training partners.

Please visit www.lssa.eu to find out more about our services and products.