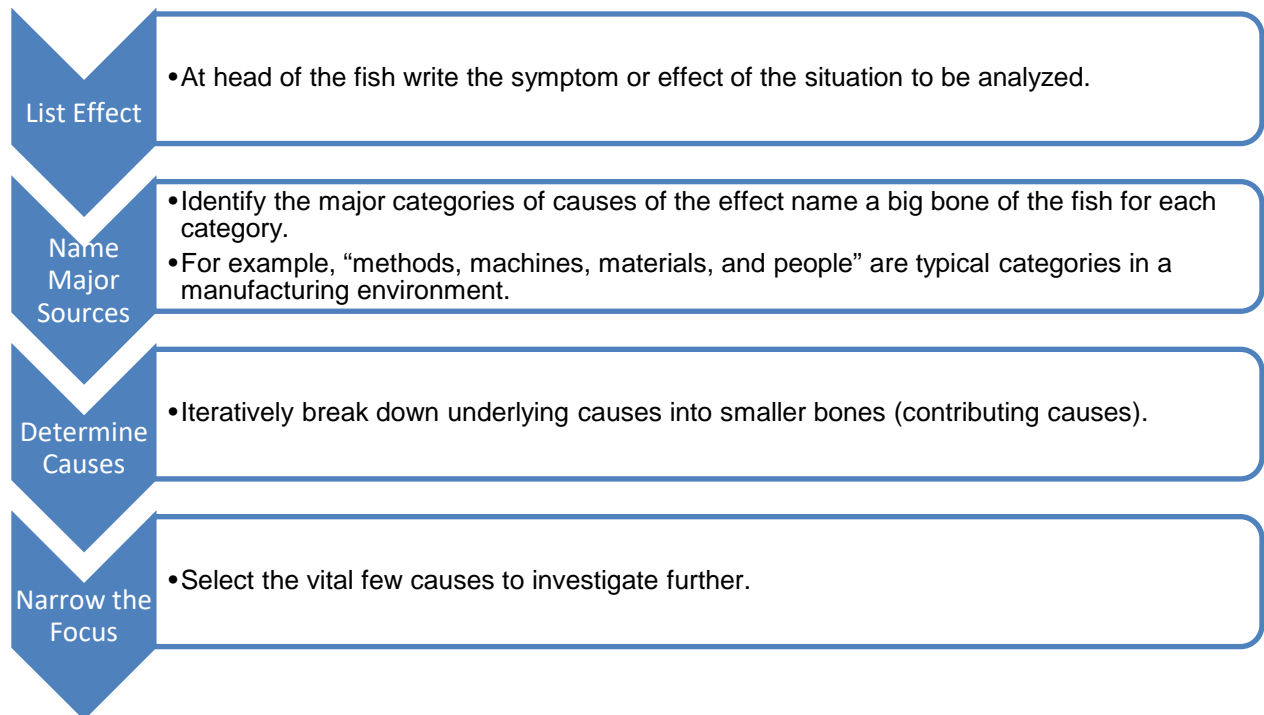# QuickTip - Cause and Effect Analysis

In 1943 Dr. Kauru Ishikawa developed cause and effect analysis. The technique creates a visual diagram of what causes an observed effect or situation. The diagram shows is usually called a fishbone diagram (after its shape) or an Ishikawa diagram (after its inventor). This technique is a structured way to think about why something is happening, allowing you to focus your limited resources on the most effective way to change the situation.

When to Use

Use this technique when you need to get to the root causes underlying a situation in order to solve the real problem rather than just a surface symptom.

Procedure

List Effect
- At head of the fish write the symptom or effect of the situation to be analyzed.

Name Major Sources
- Identify the major categories of causes of the effect name a big bone of the fish for each category.
- For example, "methods, machines, materials, and people" are typical categories in a manufacturing environment.

Determine Causes
- Iteratively break down underlying causes into smaller bones (contributing causes).

Narrow the Focus
- Select the vital few causes to investigate further.

Example

The example below shows the fishbone diagram for a situation where projects at a company often finished behind schedule. The company wanted to understand why so many projects were late and where to focus to improve things. Therefore the effect, shown on the head of the fish, is "Projects miss schedules." The main bones of the fish are the four major categories of things that contributed to past slips, such as poor planning. The smaller bones are causes that contribute to each category.

Note that the diagram is not just a collection of causes. Causes are organized into major categories to help make sure some are not left out. The company found the causes by extensively interviewing the people who worked on projects. It used the affinity clustering technique to figure out the relevant categories for the fishbone, and finally it looked for overlooked causes in each category. Then it was ready to select a vital few root causes to focus on for improvement.

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┌──────────┐                      ┌──────────┐
│  Scope   │                      │  Poor    │
│ Increases│                      │ Planning │
└──────────┘                      └──────────┘

Goldplating        Poor initial   Overestimated      Insufficient feasibility
                   definition     productivity       investigation

Customer                          Underestimated         Didn't include
needs change       Poor scope     task duration          all tasks
                   change
                   control                                           ┌──────────────┐
─────────────────────────────────────────────────────────────────── │Projects miss │
                                                                     │  schedules   │
Bottleneck on        Silo'd       Mis-               Poor risk       └──────────────┘
critical skill sets               communication      planning
                     Lack of
                     urgency                          No buffer or slack
Inadequate
staffing             Too much     Too willing to     Unplanned
                     multitasking take risks         rework

┌──────────┐                      ┌──────────┐
│  People  │                      │ Surprises│
│ Problems │                      │          │
└──────────┘                      └──────────┘
```