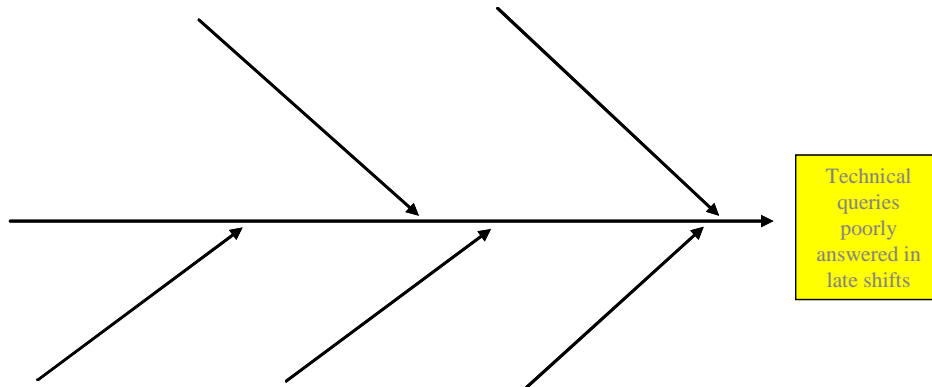


Cause and Effect Analysis using the Ishikawa Fishbone & 5 Whys

These techniques aim to get at the root causes of a problem and not just the symptoms. Kaoru Ishikawa, a Japanese Quality pioneer, introduced a very visual 'Fishbone' diagram that helps a whole team focus on this and get rapidly to consensus. This diagram:

- Resembles the skeleton of a fish
- Focus on causes rather than symptoms of a problem
- Emphasizes group communication and brainstorming
- Stimulates discussion.

The first step is to get clarity and consensus on what the problem is – to get a **focused problem statement**. A problem might be stated originally as 'customers complain of poor service'. After discussion, this might be refined to 'Poor resolution of technical queries on evenings and weekends'. This tighter statement helps focus the task of getting to the root cause of the problem. This problem statement is put at the 'head' of the fish, along with the fish's backbone:



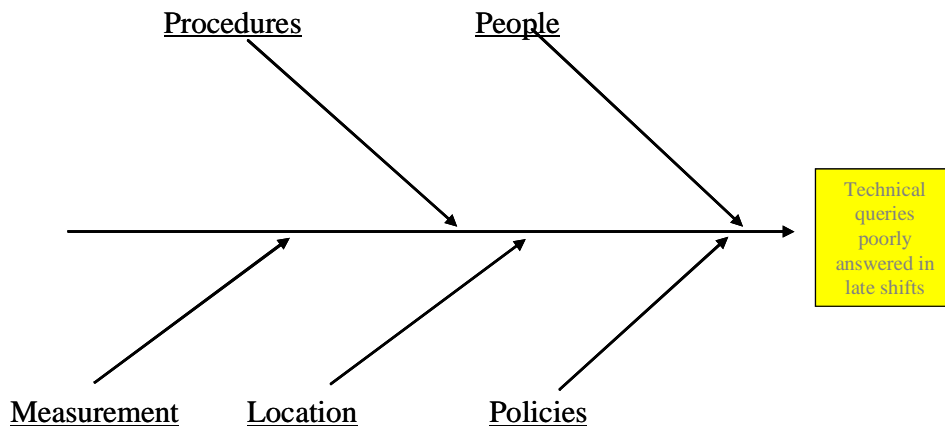
The next step is to brainstorm potential causes of the problem. This may be augmented by prior research by the team, using metrics and statistical analysis if appropriate.

The major types of cause are then laid out as large bones connected to the backbone. Either of two alternative approaches should be used:

- Categories of causes:
 - For a production/manufacturing process, these usually are People, Materials, Machinery/Equipment, Methods, Environment and Measurement.

- For a service process, they are often People, Policies, Procedures (the flow of the process), Location (Equipment/Space) and Measurement.
- Process steps – the major process steps are used.

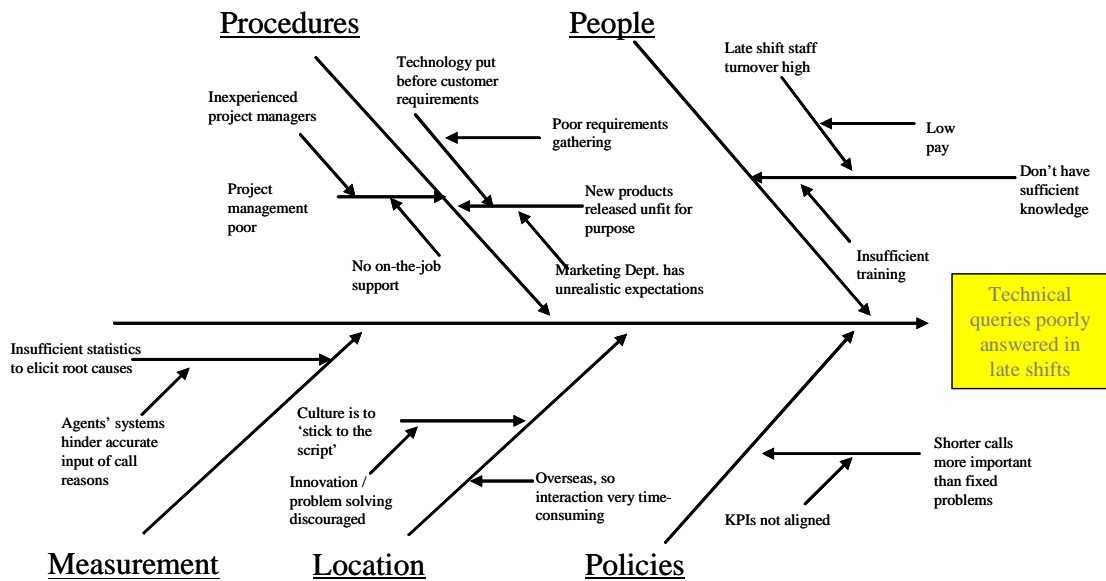
The key is to be flexible and use the category type and categories themselves most appropriate to the problem in hand, based on the causes surfaced from the brainstorm.



Each cause is added to the appropriate bone. This can be done as each cause is noted or, better, after the list has been completed – this keeps creativity flowing and avoids people feeling constrained by the bones on the diagram.

If possible, each cause should be assigned to a single category but can be added to more than one initially and sorted out later. This is most likely with 'people' type causes.

For each cause, probe deeper, asking repeatedly 'Why does this happen'. Add this as a sub-bone to the cause. The 'Five Whys' approach can be used, where the problem is analysed to five levels, give or take a level, until it is clear that the root causes have been found. Knowing when to stop is important, or one risks 'analysis by paralysis' and frustration. Use common sense. A good indicator of when to stop is when the cause is more than one level of management removed from the group.



Now analyse the results, looking for causes that appear more than once, whether within a major category or across several. Get group consensus on what the most crucial causes are and / or review the data to establish the relative frequency of the causes.

Finally, establish an action plan and responsibilities to eliminate the root causes.

Root cause analysis can be used to improve any product, process, or service:

- Any area of the company that is experiencing a problem
- Isolates all relevant causes.

By default, fishbone diagrams are produced on large sheets of paper so that they can be moved around, or drawn on photocopyable white boards or ones linked to PCs. Commercial software is now available to draw and maintain the diagrams. Where a sheet of paper or white board is used, large Post-its™ can be used to place the causes on the diagram, as these can then be re-placed easily.