

A Faster Way to Find and Map Causes

The Causal Map Style of Fishbone Diagrams

By Kathy Iberle



Key Points

- Ishikawa's first fishbone diagram illustrated frequent causes of problems in manufacturing.
- Ishikawa-style fishbone diagrams are useful for brainstorming possible causes.
- When you need to find root causes, a causal-map fishbone diagram is much more effective than an Ishikawa diagrams.

Traditional Fishbone Diagramming

You've probably used a fishbone diagram to map cause and effect during problem-solving. Most likely you learned the classic Ishikawa-style fishbone diagram.

In 1982, [Kaoru Ishikawa used a fishbone diagram](#) to show the results of a statistical analysis of causes. In this paper, Ishikawa wasn't mapping cause and effect of a single problem. He was looking for patterns among multiple problems, and in particular which types of causes occurred the most often. His original four categories eventually became six, which we now know as Man/Machine/Materials/Method/Measurement/Environment or something similar.

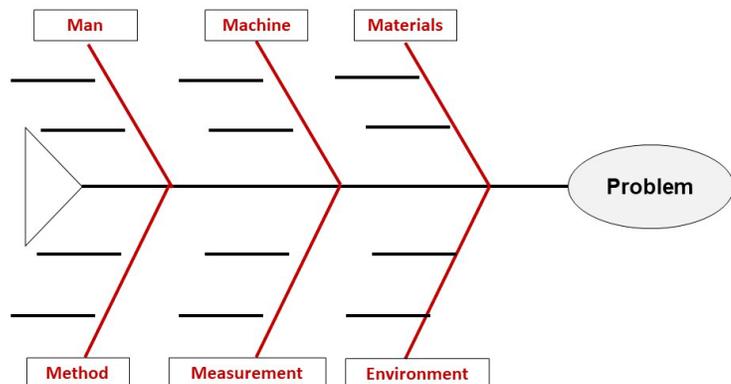
Since that time, Ishikawa-style fishbone diagrams have been used two different ways:

- To brainstorm possible causes, by listing possible causes in each category.
- To map cause and effect among multiple causes and their subcauses. This is essentially a Five-Whys analysis in more than one dimension.

While brainstorming possible causes seems consistent with Ishikawa's original use of the fishbone diagram, cause-and-effect mapping was probably not part of his intent and is in fact quite a poor fit.

That's because the labels on an Ishikawa-style diagram **are not causes**. They are **categories** of causes.

The category labels are helpful when you're brainstorming possible causes. However, the labels get in the way when you're exploring chains of cause and effect to find the root causes. You don't have room to ask "Why" five times, or map relationships between causes.



Category Labels Make Causal Mapping More Difficult, not Less

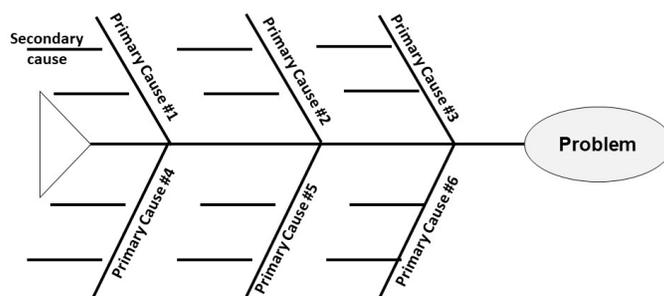
Drawing both categories and causal chains on the same diagram creates several problems:

- 1) The categories on the diagram use up considerable space, discouraging the user from mapping additional causes and tracking what causes what.
- 2) The categories also seem to discourage mapping relationships between causes, especially if those are in different categories. Yet the relationships are often key in identifying the most powerful possible change – the one which will address the most causes at once.
- 3) Many people confuse categories with causes. The category “Machine” by itself didn’t cause anything. “Machine” is just a trigger to help you think of causes which are in that general category. The confusion usually doesn’t result in a clear, understandable analysis of causes.

Causal-Map Fishbone Diagrams

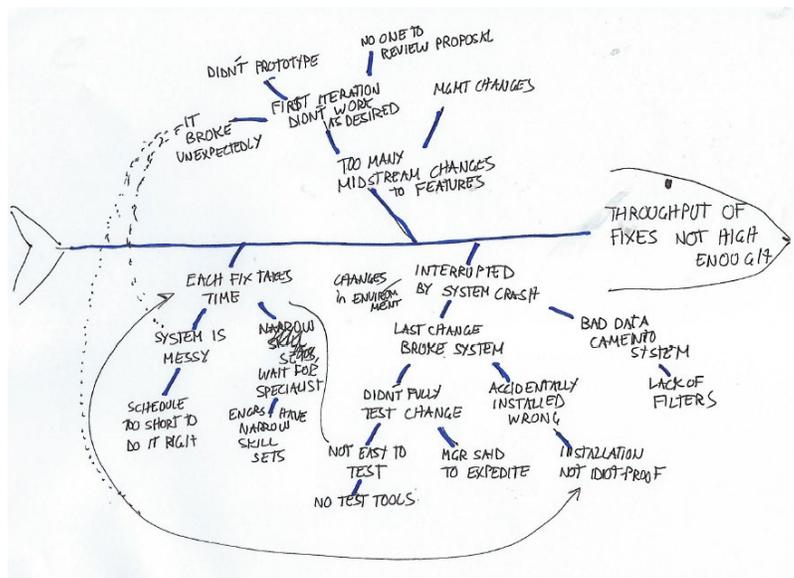
A fishbone diagram which shows **only** causes looks like this:

This diagram focuses on showing the relationships between causes. The categories are not shown. A “causal map” style diagram often is messier than an Ishikawa diagram, and it may look less like a fish skeleton. However, the causal map format provides much more room to capture information about relationships, and it seems to encourage thinking more deeply about root cause.



A fishbone causal map starts at the spine of the fish and works outwards. The problem is drawn in the head, and then probable causes are drawn on “ribs” connected to the spine. As subcauses are identified, those are drawn on riblets, and so forth. It’s essentially the same as the 5-Whys method with the addition of more than one dimension.

This real-life example includes chains of causes, and some loops indicating where a single cause might be contributing to more than one of the observed problems at the same time.



The causal-map style of fishbone diagramming helps the team identify causes more quickly and efficiently, and record their thinking without the complication of categories.

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