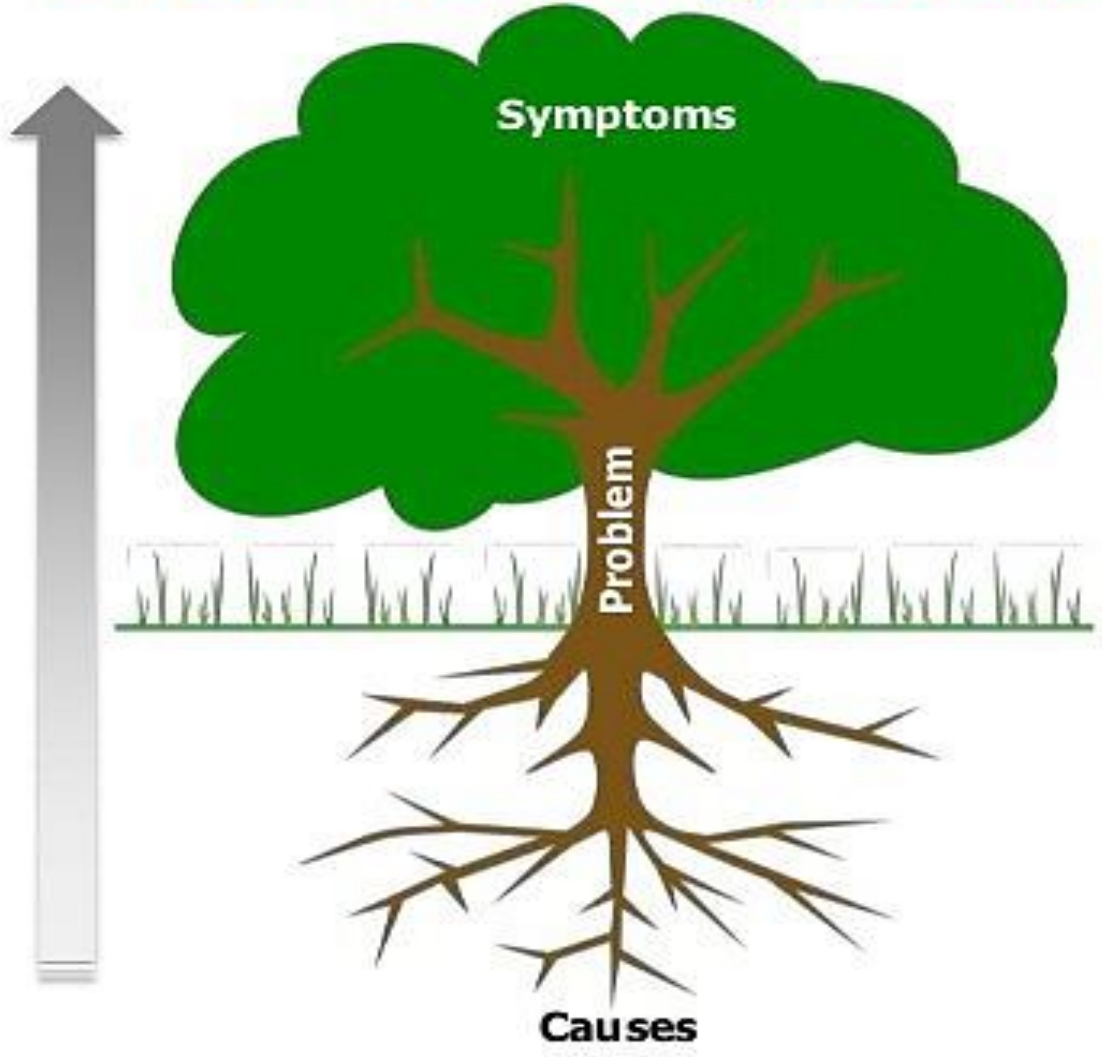
Root Cause Analysis

Understanding the Problem Statement in Deep

- Pareto Chart
- The 5 Whys
- Fishbone Diagram
- Scatter Diagram

Understanding Root Causes



Symptoms
- Result or outcome of the problem
- What you see as a problem *(Obvious)*

Achy, weak, tired

The Problem
- Gap from goal or standard

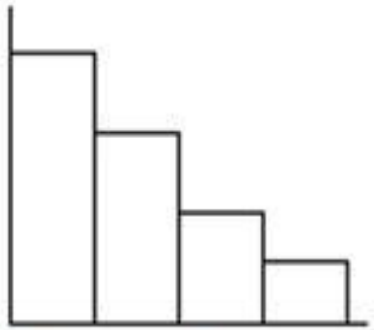
Fever

Causes
- "The Roots" – system below the surface, bringing about the problem *(Not Obvious)*

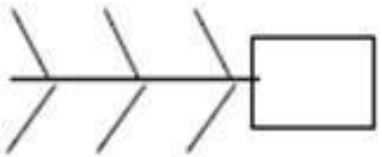
Infection

TOP MENTOR

Brainstorming

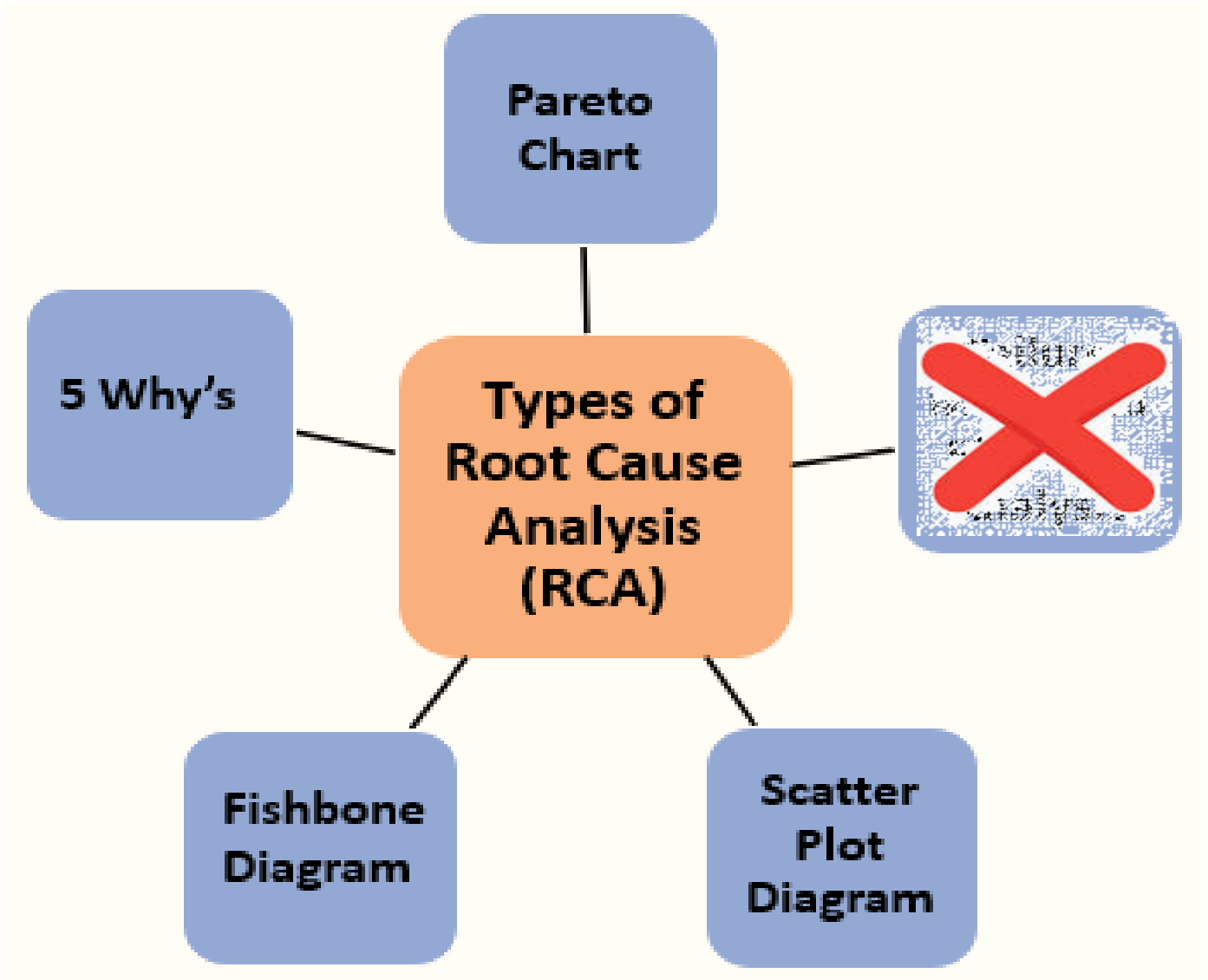


Pareto Chart



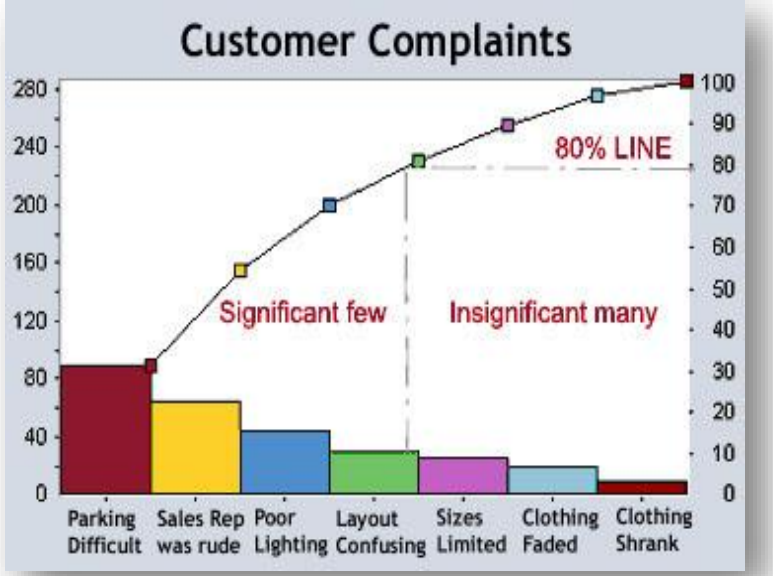
Fishbone Diagram

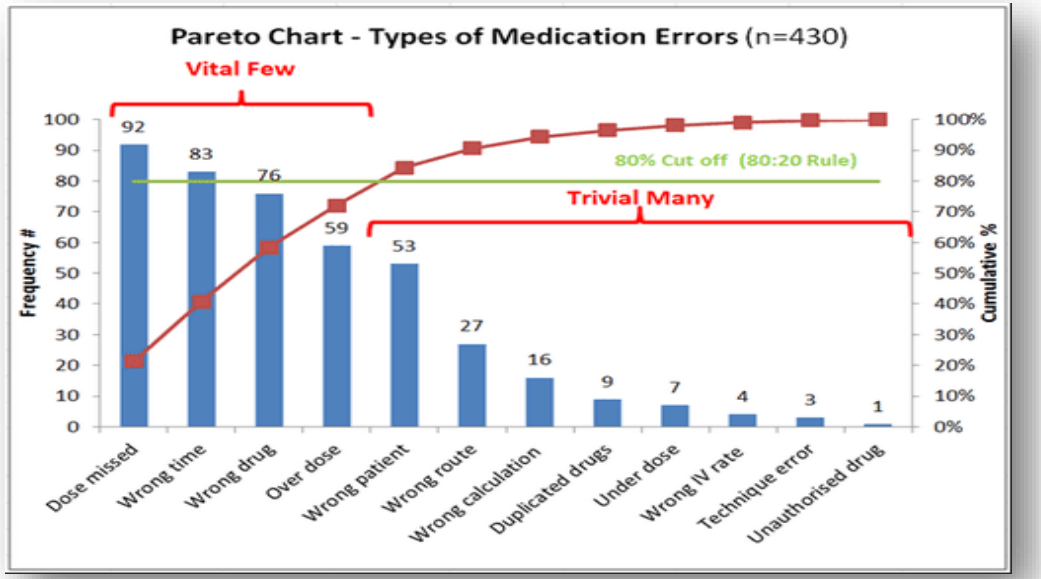
Scatter Diagram


Pareto Chart
5 Why's
Types of Root Cause Analysis (RCA)
Fishbone Diagram
Scatter Plot Diagram

Pareto Chart

Pareto chart is a histogram or bar chart combined with a line graph that groups the frequency or cost of different problems to show their relative significance. The bars show frequency in descending order, while the line shows cumulative percentage or total as you move from left to right. he lengths of the bars represent frequency or cost (time or money) and are arranged with longest bars on the left and the shortest to the right. In this way the chart visually depicts which situations are more significant.

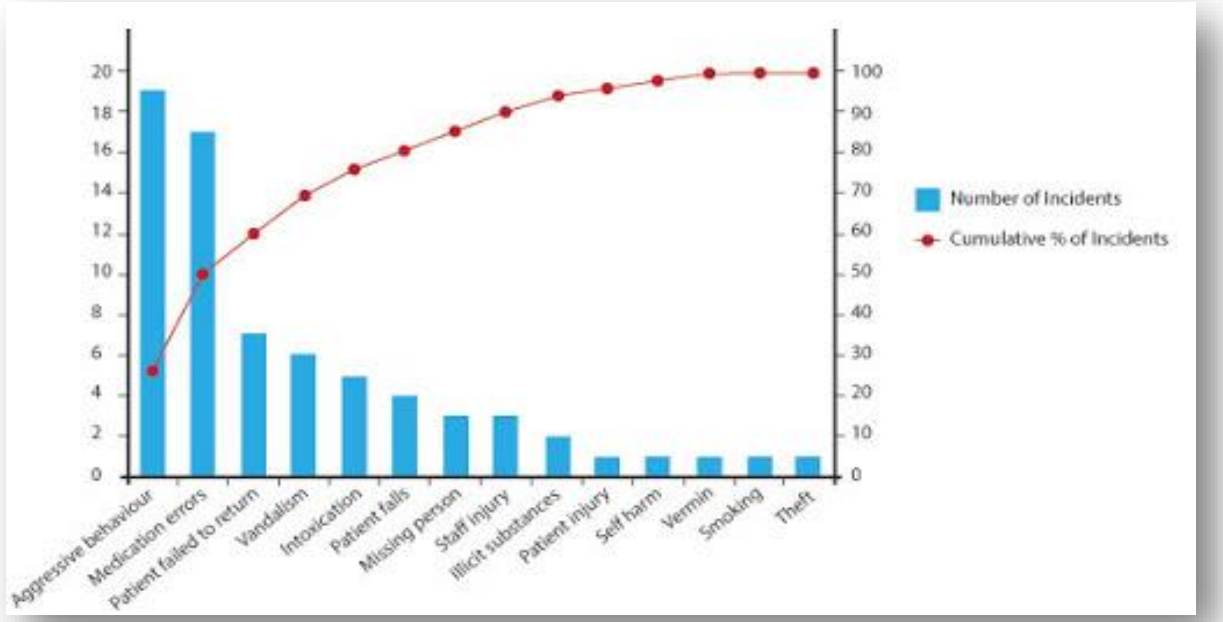




TOP MENTOR

WHEN TO USE A PARETO CHART

- When analyzing data about the frequency of problems or causes in a process
- When there are many problems or causes and you want to focus on the most significant
- When analyzing broad causes by looking at their specific components
- When communicating with others about your data



PARETO CHART PROCEDURE

- Decide what categories you will use to group items.
- Decide what measurement is appropriate. Common measurements are frequency, quantity, cost and time.
- Decide what period of time the Pareto chart will cover: One work cycle? One full day? A week?
- Collect the data, recording the category each time, or assemble data that already exist.
- Subtotal the measurements for each category.
- Determine the appropriate scale for the measurements you have collected. The maximum value will be the largest subtotal from step 5. (If you will do optional steps 8 and 9 below, the maximum value will be the sum of all subtotals from step 5.) Mark the scale on the left side of the chart.
- Construct and label bars for each category. Place the tallest at the far left, then the next tallest to its right, and so on. If there are many categories with small measurements, they can be grouped as “other.”

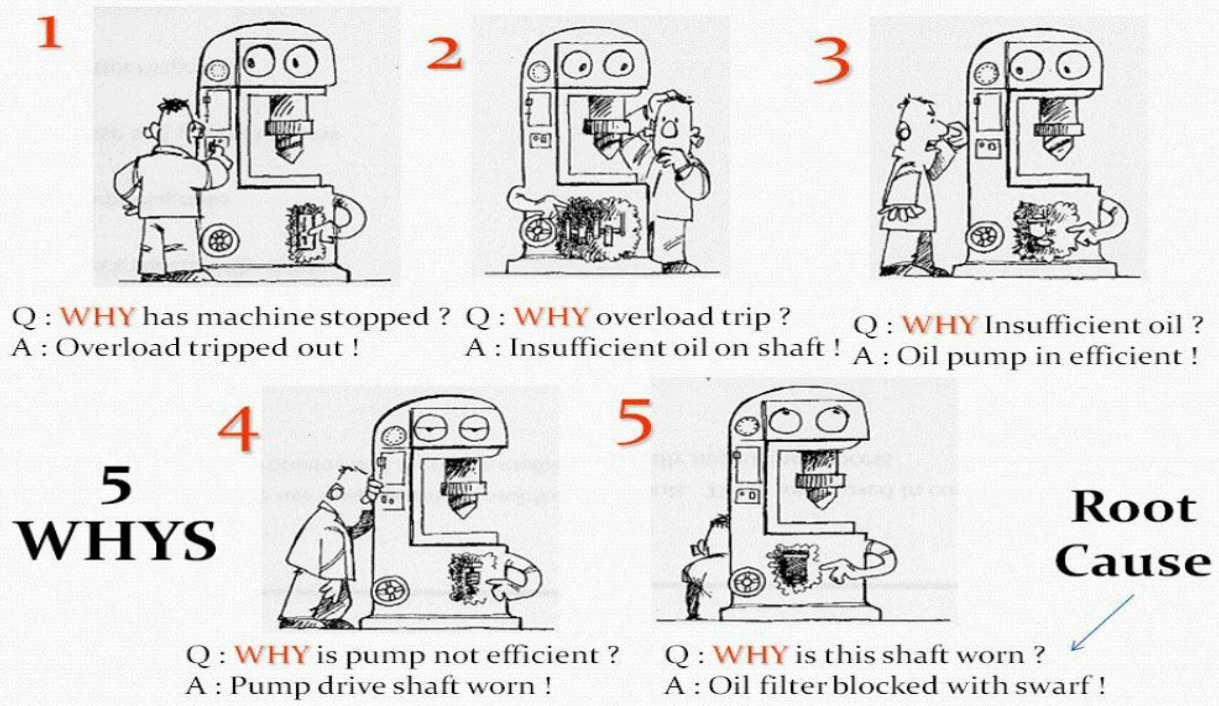
Note: Steps 8 and 9 are optional but are useful for analysis and communication.

- Calculate the percentage for each category: the subtotal for that category divided by the total for all categories. Draw a right vertical axis and label it with percentages. Be sure the two scales match. For example, the left measurement that corresponds to one-half should be exactly opposite 50% on the right scale.

- Calculate and draw cumulative sums: add the subtotals for the first and second categories and place a dot above the second bar indicating that sum. To that sum add the subtotal for the third category and place a dot above the third bar for that new sum. Continue the process for all the bars. Connect the dots, starting at the top of the first bar. The last dot should reach 100% on the right scale.

5 Whys

The 5 Whys is a method that uses a series of questions to drill down into successive layers of a problem. The basic idea is that each time you ask why, the answer becomes the basis of the next why. It's a simple tool useful for problems where you don't need advanced statistics, so you don't necessarily want to use it for complex problems.



Problem
Our client is refusing to pay for leaflets we printed for him

Why?

The delivery was late, so the leaflets couldn't be used

Why?

The job took longer than we expected

Why?

We ran out of printer ink

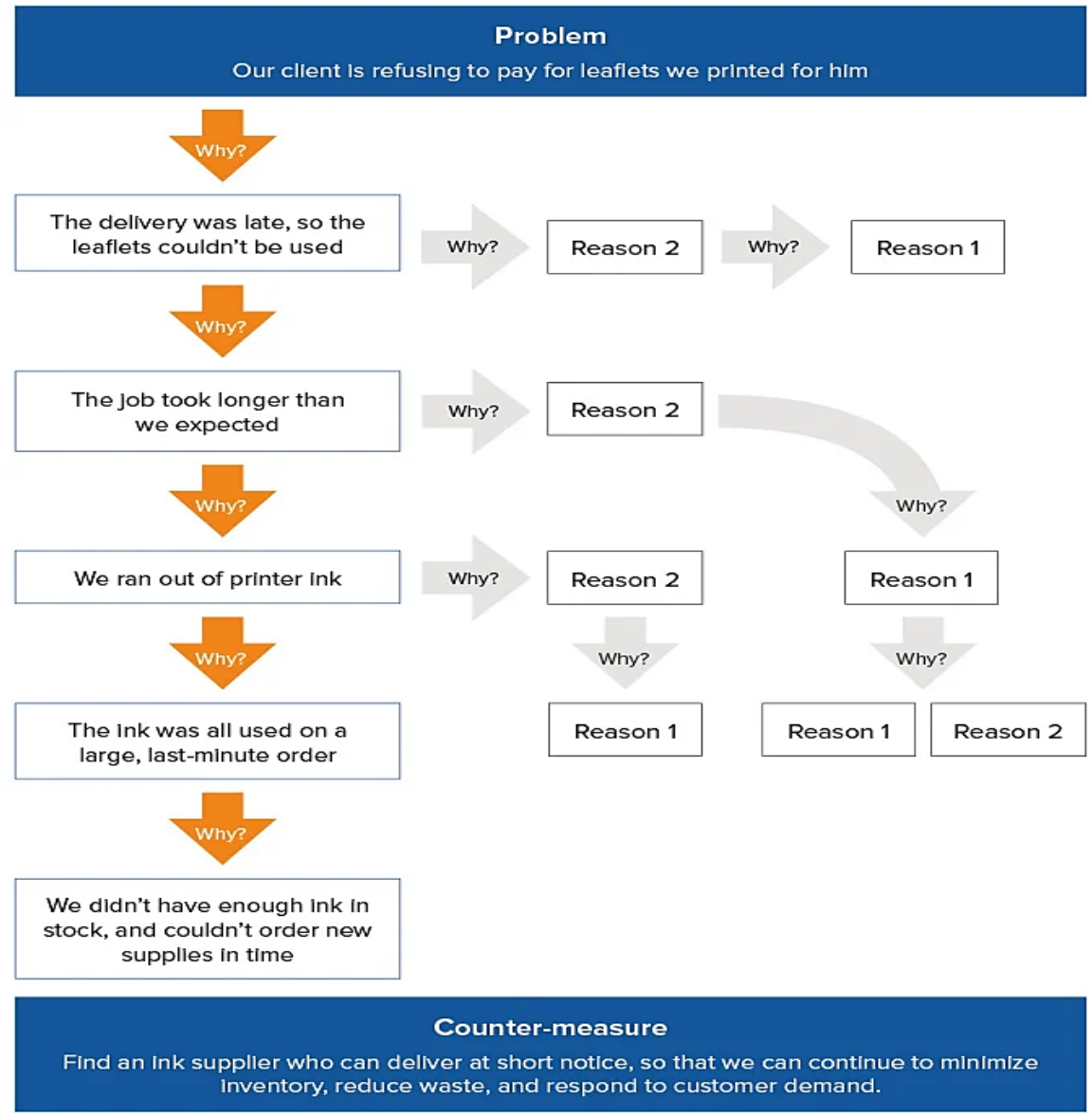
Why?

The ink was all used on a large, last-minute order

Why?

We didn't have enough ink in stock, and couldn't order new supplies in time

Counter-measure
Find an ink supplier who can deliver at short notice, so that we can continue to minimize inventory, reduce waste, and respond to customer demand.

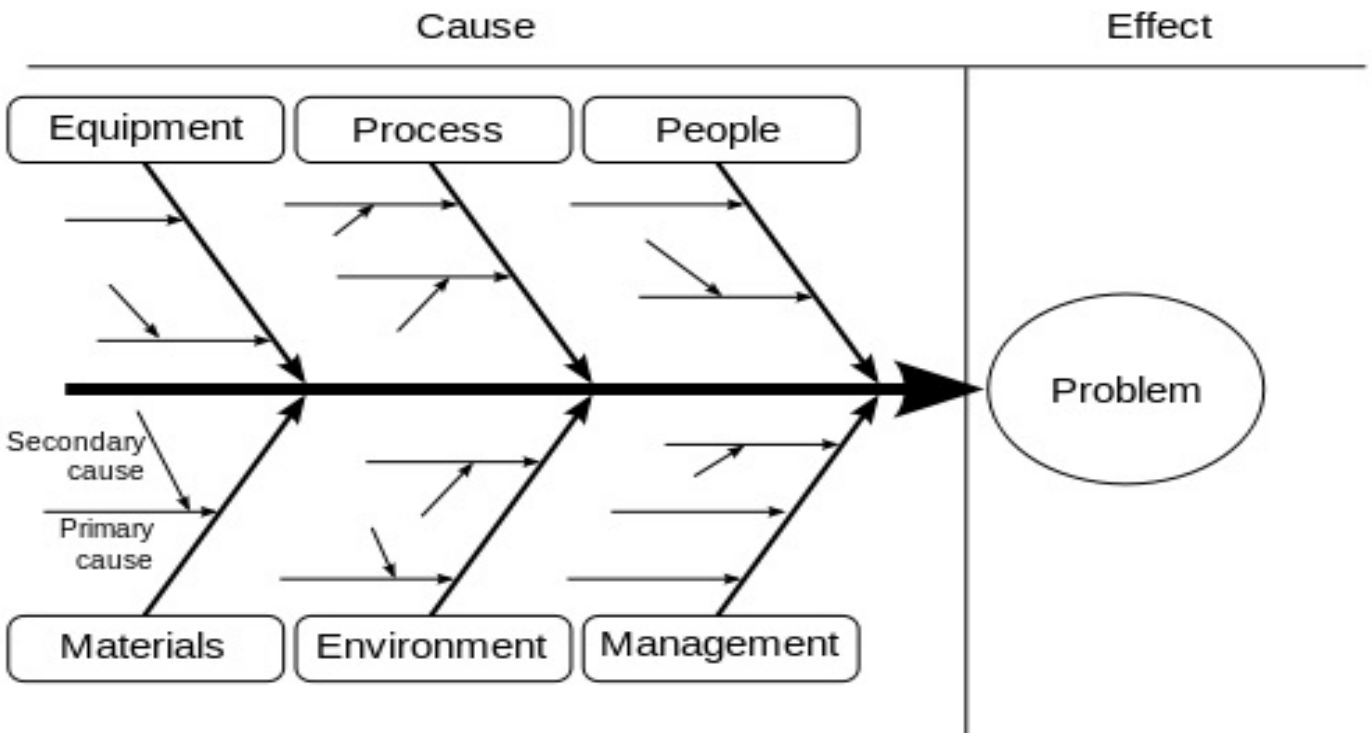


Problem: Final assembly time exceeds target

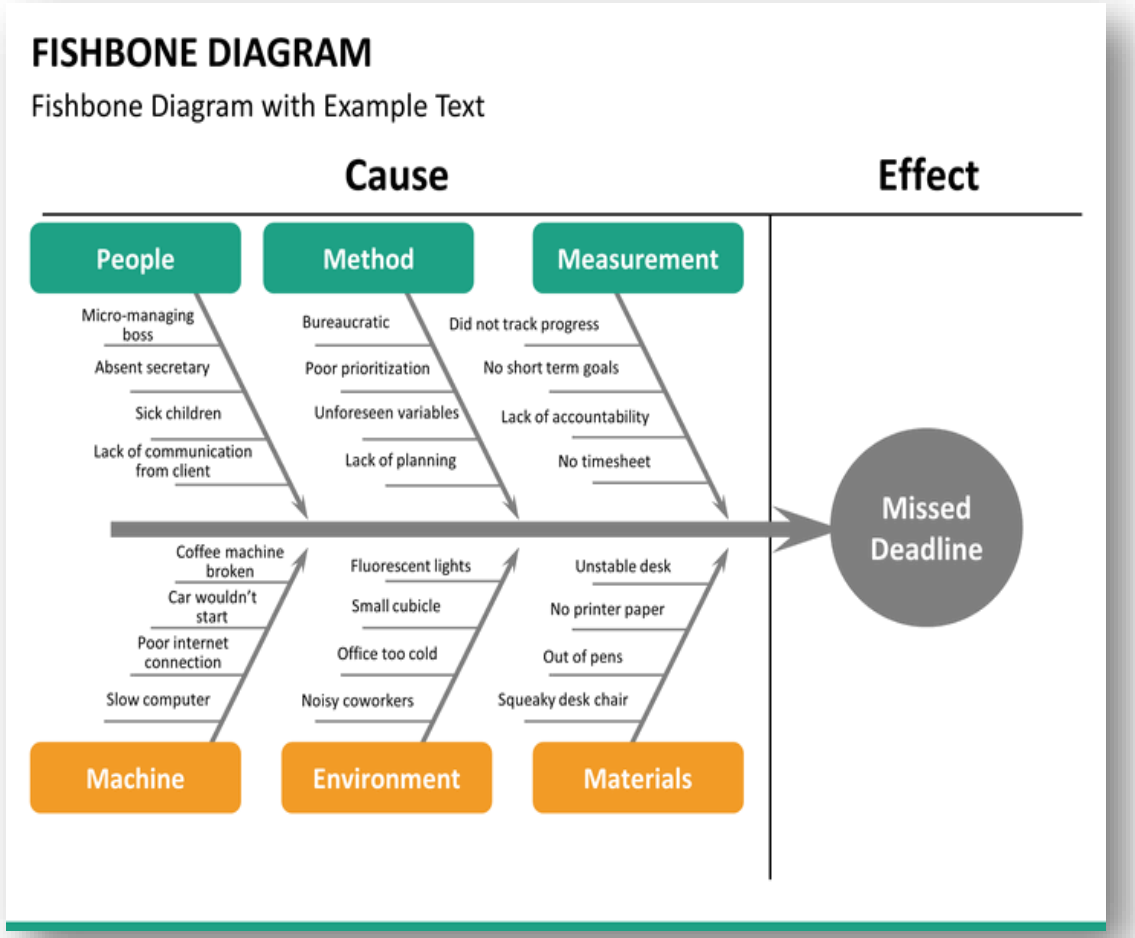
- Why is downtime in final assembly higher than our goal? According to the Pareto chart, the biggest factor is operators needing to constantly adjust Machine A.
- Why do operators need to constantly adjust Machine A? Because it keeps having alignment problems
- Why does Machine A keep having alignment problems? Because the seals are worn
- Why are Machine A's seals worn? Because they aren't being replaced as part of our preventive maintenance program
- Why aren't they being replaced as part of our preventive maintenance program? Because seal replacement wasn't captured in the need's assessment
- Of course, it may take asking why more than five times to solve the problem—the point is to peel away surface-level issues to get to the root cause.

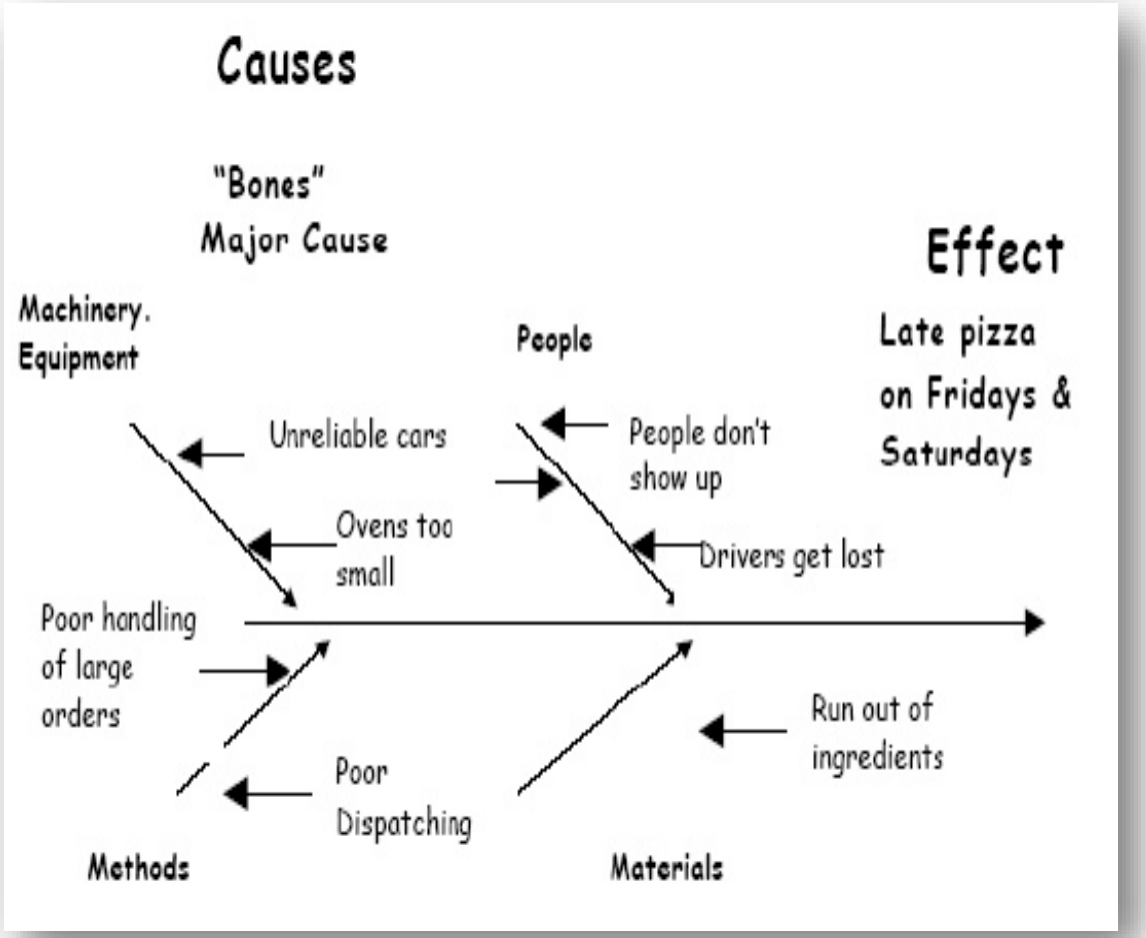
Fishbone Diagram

A fishbone diagram sorts possible causes into various categories that branch off from the original problem. Also called a cause-and-effect or Ishakawa diagram, a fishbone diagram may have multiple sub-causes branching off each identified category.



Examples – Fishbone Diagram





Scatter Plot Diagram

A scatter plot or scatter diagram uses pairs of data points to help uncover relationships between variables. A scatter plot is a quantitative method for determining whether two variables are correlated, such as testing potential causes identified in your fishbone diagram.

Making a scatter diagram is as simple as plotting your independent variable (or suspected cause) on the x-axis, and your dependent variable (the effect) on the y-axis. If the pattern shows a clear line or curve, you know the variables are correlated and you can proceed to regression or correlation analysis.