

Quality Control Tools

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Ricardo Viana Vargas is a project, portfolio and risk management specialist. During the past 15 years, he has been responsible for over **80 major projects** in various countries in the areas of petroleum, energy, infrastructure, telecommunications, information technology and finances, comprising an investment portfolio of over 18 billion dollars.

He was the first Latin American volunteer to be elected Chairman of the Board for the **Project Management Institute (PMI)**, the largest project management organization in the world with close to 500,000 members and certified professionals in 175 countries.

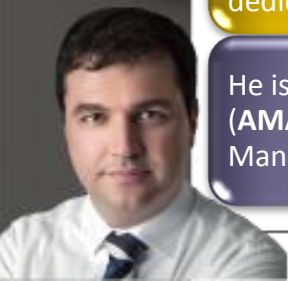
Ricardo Vargas has written **ten books** on project management, published in Portuguese and English, which have sold over 200,000 copies throughout the world. In 2005 he received the PMI Distinguished Award for his contribution to the development of project management and the PMI Professional Development Product of the Year award for the PMDome® workshop, considered the best project management training solution in the world.

He is a project management professor for various MBA courses, and actively participates on editorial boards for specialized journals in Brazil and the United States. Vargas is a recognized reviewer of the **PMBOK Guide**, the most important reference in the world for project management, and also chaired the official translation of PMBOK into Portuguese.

He is a chemical engineer and holds a master's degree in Industrial Engineering from UFMG (Federal University of Minas Gerais). Ricardo Vargas also holds a Master Certificate in Project Management from George Washington University and is certified both as a Project Management Professional (PMP) by PMI and as IPMA-B by the International Project Management Association. He attended the Program on Negotiation for Executives at **Harvard Law School**.

Over an eleven year timeframe, which began in 1995, Ricardo, in conjunction with two partners, established one of the most solid Brazilian businesses in the area of technology, project management and outsourcing, which had a staff of **4,000 collaborators** and an annual income of 50 million dollars in 2006, when Ricardo Vargas sold his share of the company to dedicate himself on a fulltime basis to the internationalization of his project management activities.

He is a member of the Association for Advancement of Cost Engineering (**AACE**), the American Management Association (**AMA**), the International Project Management Association (**IPMA**), the Institute for Global Ethics and the Professional Risk Management International Association (**PRMIA**).



Quality Control Tools

Inspection

Checklist

Control
Charts

Pareto Chart

Statistical
Sampling

Flowcharting



Inspection

Inspection includes activities like:

- Measure,
- Examine,
- Test.

It determines whether the results comply with the requirements.

Inspections are executed in different process levels.



Checklist

It is a list with previously defined options that are used as a guide to control risks.

It allows a thorough evaluation in a short period of time.



Control Charts

Control charts present the results of a process over time.

They are used to determine if the process is under control.

They are used to monitor any type of variable output.

Can be used to monitor

- **Cost and schedule variances;**
- **Volume and frequency of changes;**
- **Errors in the project documentation**



Chart Control Components

Mean

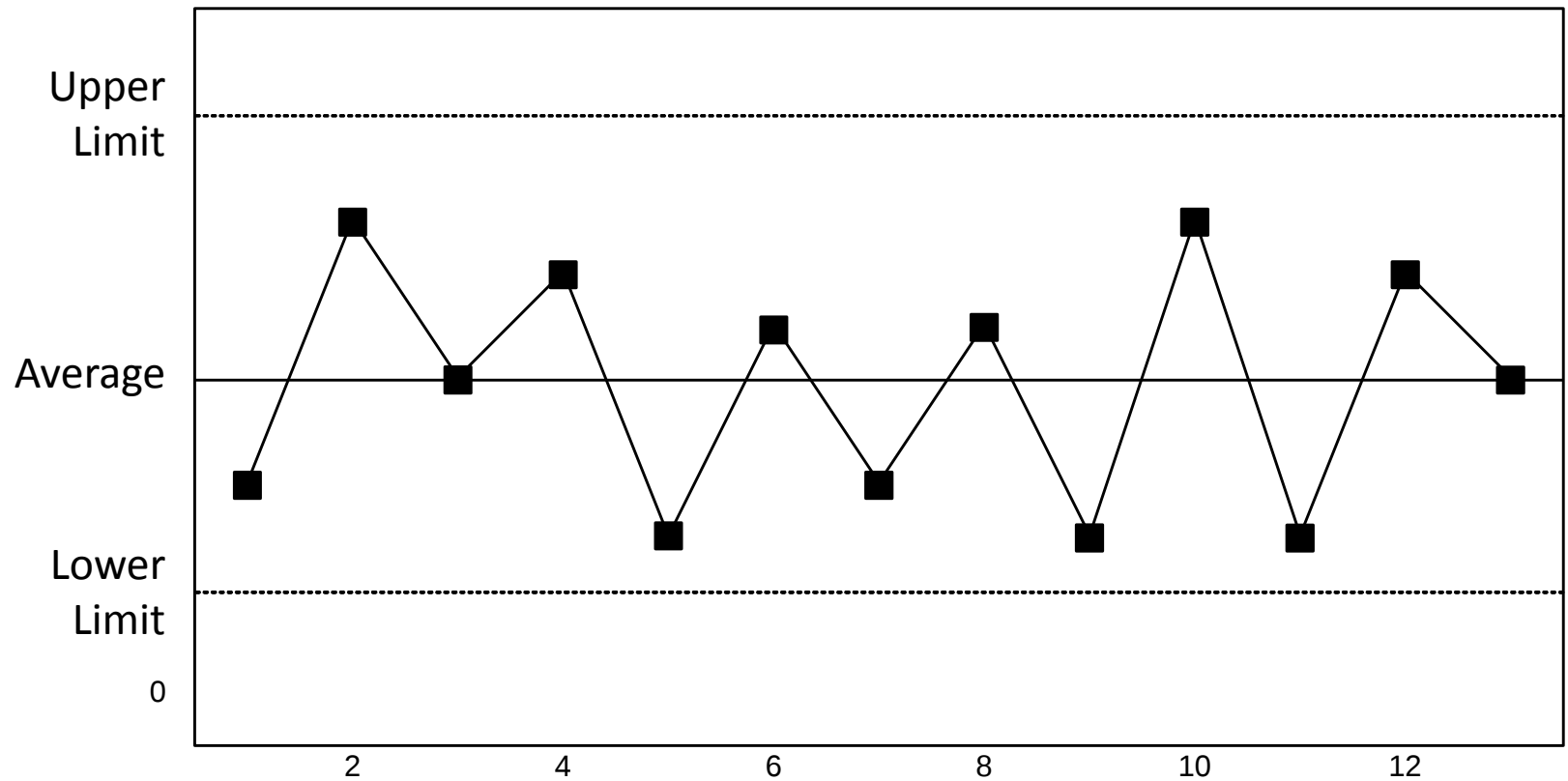
Line in the middle of the control chart that shows the acceptable variance tolerance in the process.

Upper and Lower Limits represent the client's expectations or the contractual requirements for performance and quality.

- They are characteristics of the process and vary from case to case. They are usually inputs from clients.



Chart Control



Out of Control Process

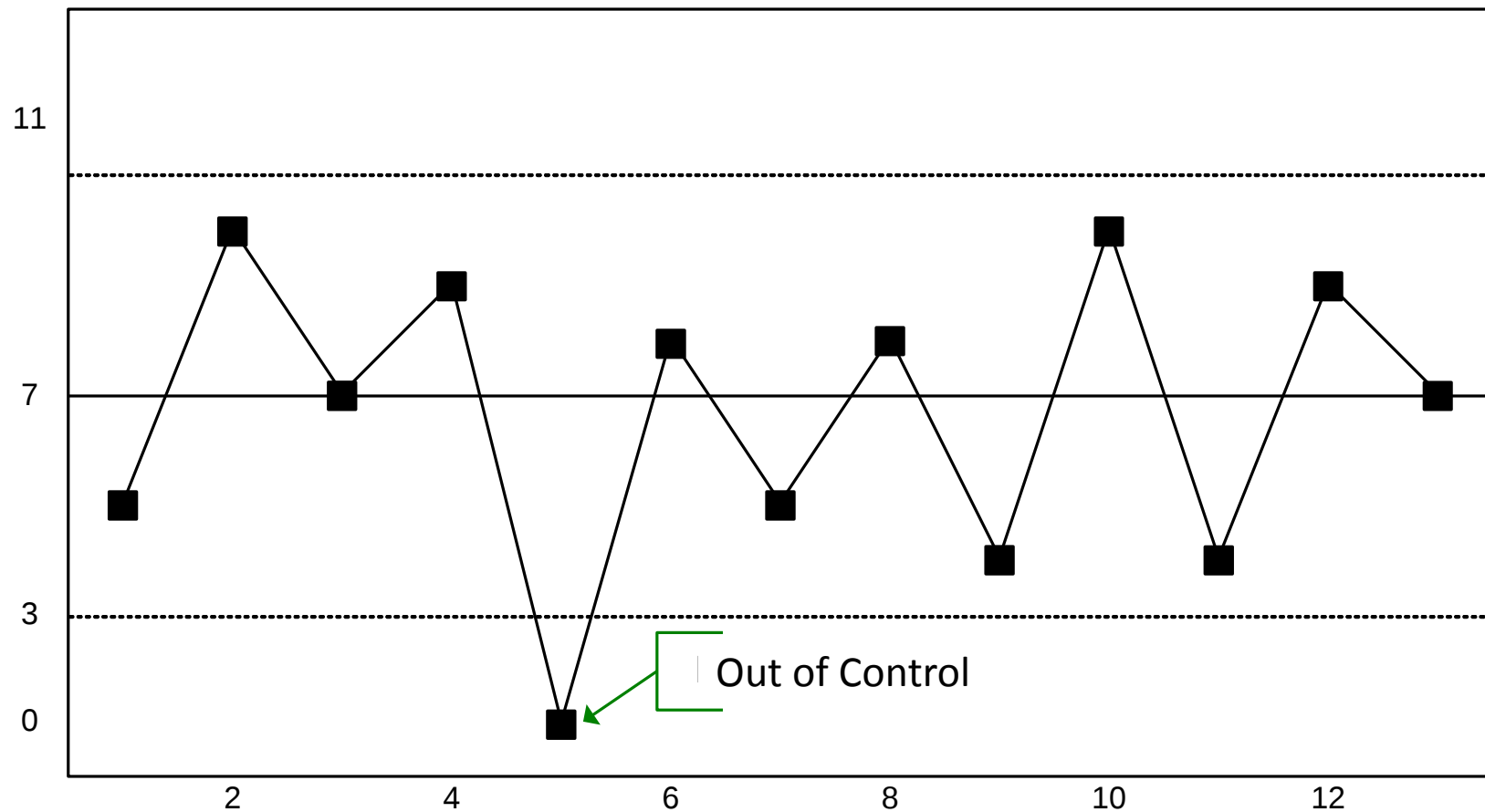


The process is out of statistical control under one of two circumstances:

- A point is out of the control limits boundaries or there are;
- Non random points that are within the upper and lower limits, as stated by the rule of seven.

Think of “out of control” as a lack of consistency and predictability in the process.

Out of Control Process



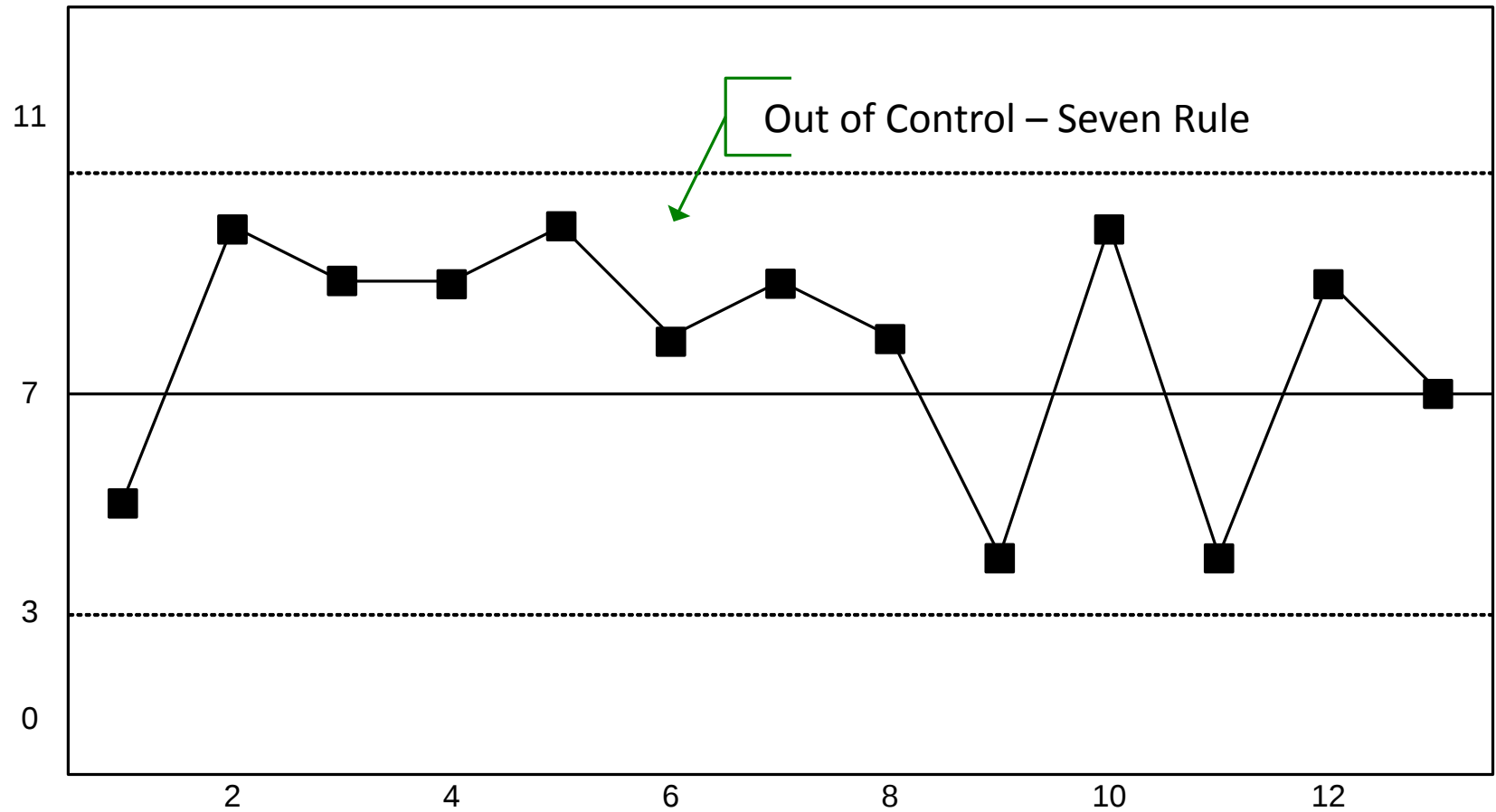
The Rule of Seven in Control Charts

Refers to non random points grouped in a series, Refere-se a pontos não randômicos agrupados em séries, totalizing seven, all of them on one side of the mean.

The rule states that, even though none of these points is out of the control limits, they are not random and so the process is out of control.



Out of Control Process – Rule of Seven



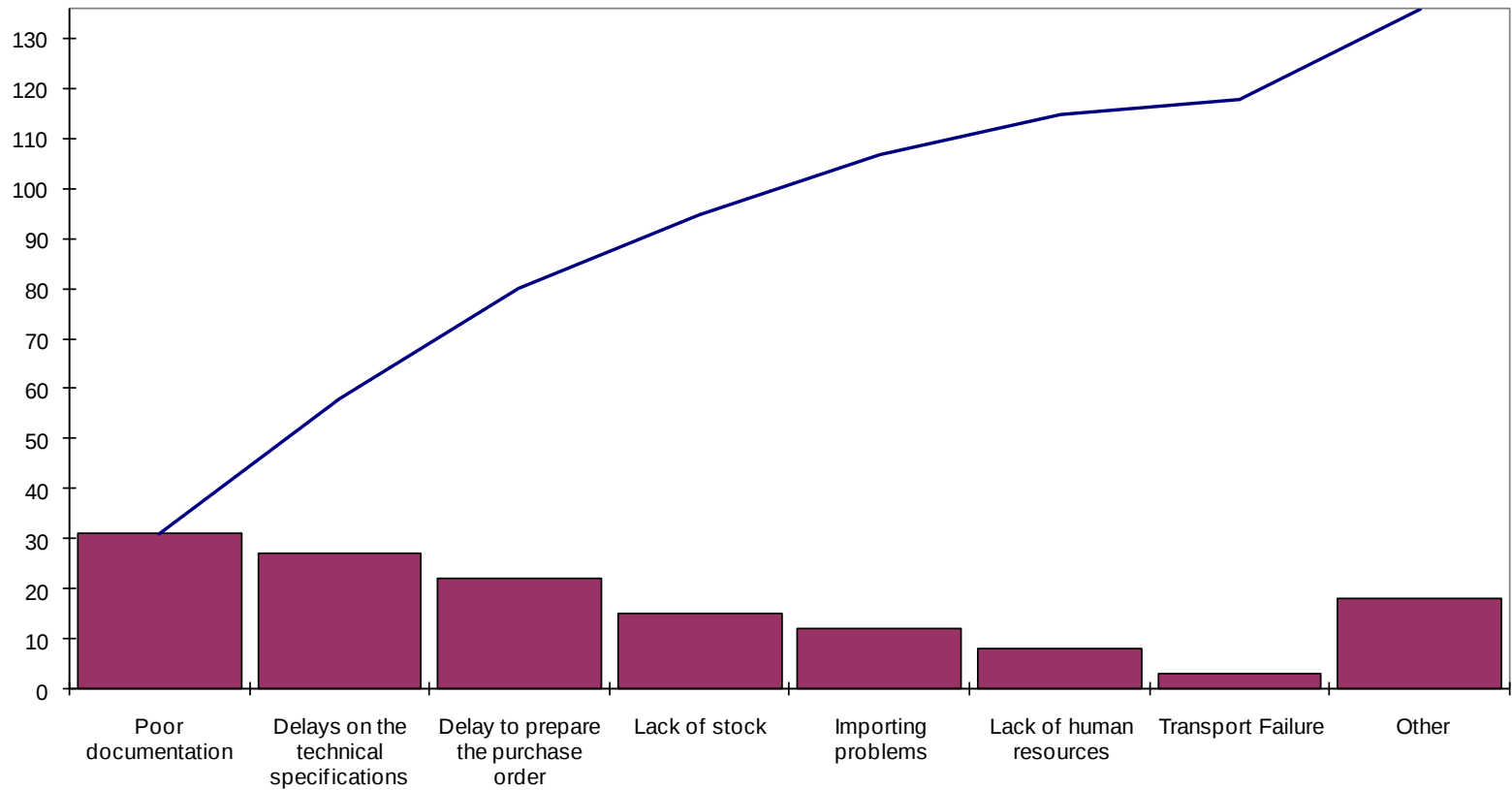
Pareto Chart

The Pareto Chart is a histogram ordered by the frequency of result occurrences, showing how many results were generated by the type or category of the identified cause.

The relative position of the occurrences is used to guide corrective actions.

- The corrective actions must initially focus on the problems that are causing the majority of defects.

Pareto Chart



Pareto Law (80 x 20)

The Pareto Law states that a small number of causes will typically produce the majority of problems or defects.

Examples

- A person spends 80% of his/her time watching to only 20% of the available cable channels
- A person goes out 80% of the times with the same 20% of his/her friends.
- 80% of foods always use 20% of recipes.



How to Build a Pareto Chart

List the potential failures and their equivalent occurrences.



Sort the failures in descending order of the number of occurrences.



Determine the relative percentages of each of the failures.



Accumulate, in descending order, the percentages of each one of the failures up until the last failure sums up to 100%;



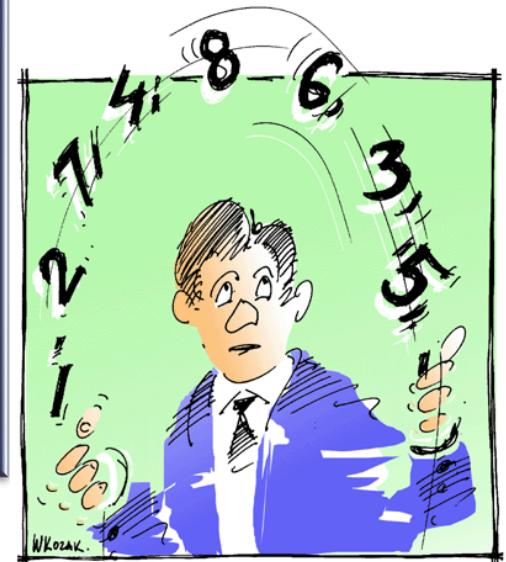
Build the chart Failure x Accumulated Percentage.

Statistical Sampling

Statistical sampling involves choosing a portion of the desired population for inspection.

- Example – Choose randomly ten engineering plants from a list of one hundred and evaluate them.

Frequently reduce the cost of quality control



Use of Statistical Sampling

It's best to analyse a sample instead of the whole population if analysing the whole population would

- Take too long
- Cost too much
- Be destructive, as in
 - Testing matches...
- Or when one believes there are not no many defects

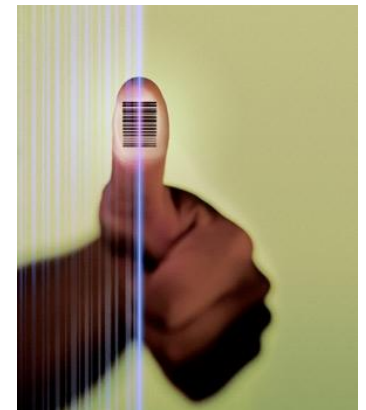


Flowcharting

A flowchart is any chart that depicts how several elements interact with each other

Here are a few flowcharting techniques that are usually used in quality management

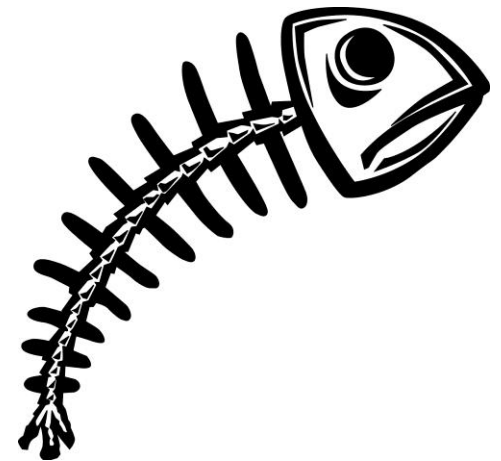
- Cause and Effect Diagram
- Systems or Process Flowcharts



Cause and Effect Diagram (Fishbone)

It shows how several causes relate themselves to problems or potential effects.

Also known as Ishikawa Diagram or Fishbone Diagram.



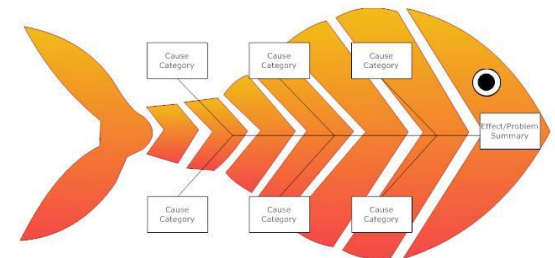
Characteristics of Cause and Effect Diagram

It's a creative way to look at causes or potential causes to problems.

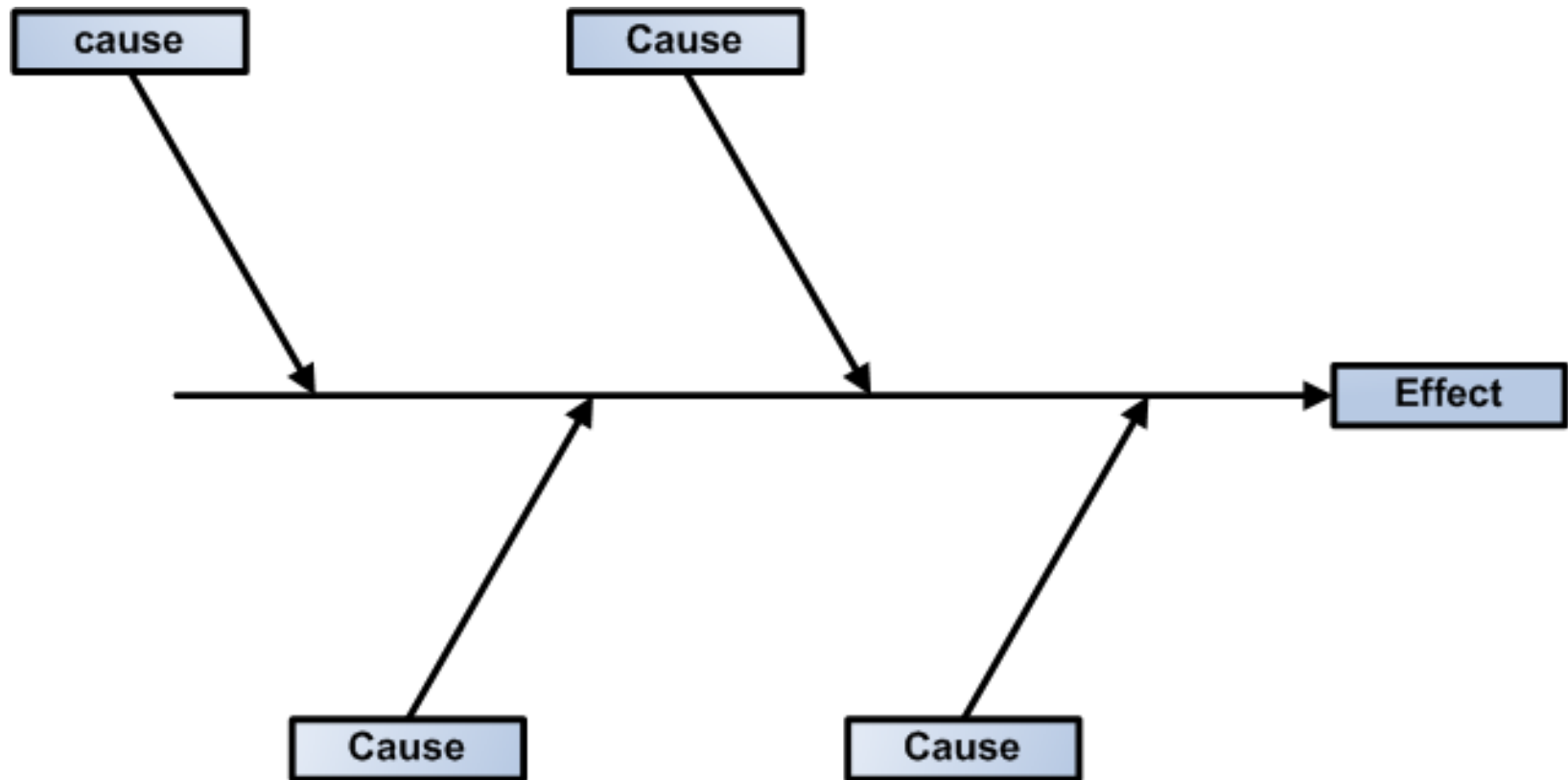
It helps creative thinking, organizes ideas and foster discussions.

It explores the factors that may lead to a desired outcome.

It can also be executed using the mindmapping technique.



Cause and Effect Diagram

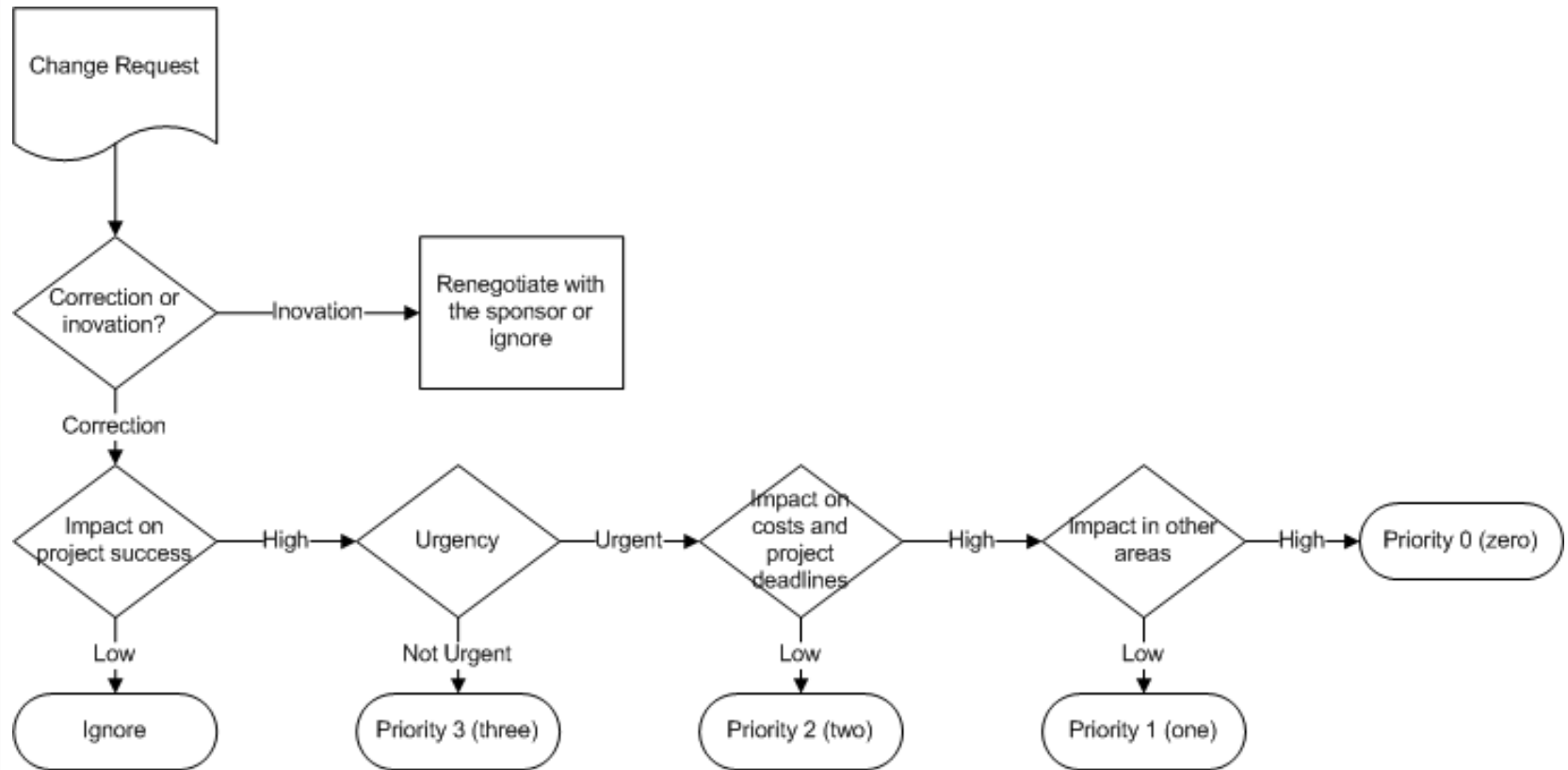


System or Process Flowcharts

Depiction of how several elements in a system/process interact with each other according to a determined decision flow



System or Process Flowcharts



Based in Vargas, R. V. *Practical Guide to Project Plan*: New York, Auerbach, 2007

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