Module 7

Quality Tools

Housekeeping

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What is Housekeeping?

Good housekeeping is the foundation of a safe, healthy and pleasant workplace.

It is important that all areas should be kept clean, in order, and with all necessary things in their correct places.
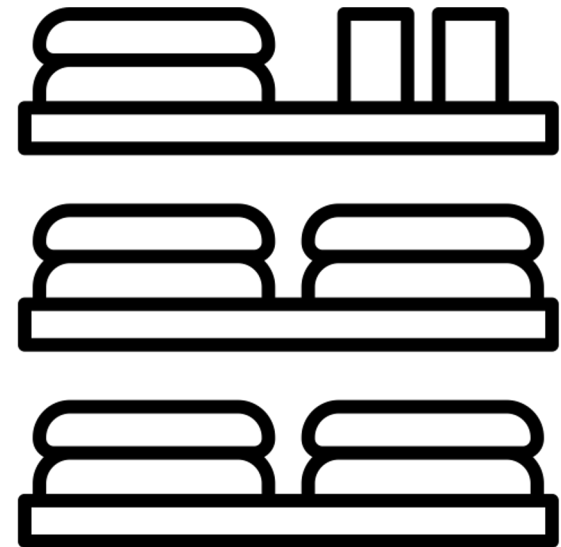
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Why is it important?

It helps eliminate hazards arising from poor housekeeping

Good housekeeping improves safety, efficiency and quality at the same time

It is easier to find things

Effective use of space

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from Noun Project

Housekeeping Guidelines

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Good housekeeping is a team effort and a team is made up of individuals.

The individual employee's responsibility is to keep work areas clean, neat, tidy and free from excessive material at all times.

Evaluate the workplace and check for any hidden hazards.

Use proper equipment and protective gears while cleaning the workplace

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Things to remember and practise

- Put trash, recyclable materials in proper designated bins

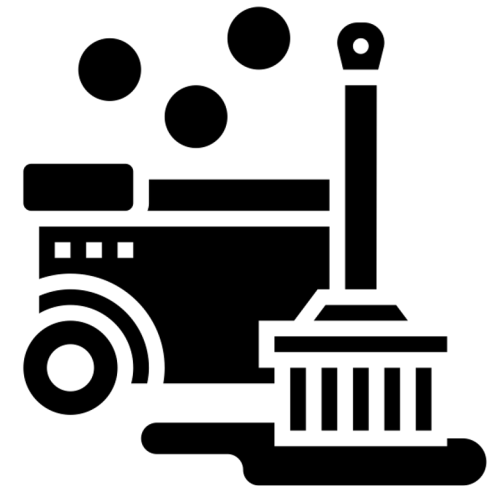- Keep the floor free from excessive materials

- Keep walkways and aisle free from any obstruction

- Stack materials correctly in proper places

- Always retains tools to their respective place after use

- Remove sharp objects such as nails, spikes, wire etc.

- Ensure that spills are cleaned

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Benefits of Housekeeping

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Improved productivity	Improved morale	Decreased fire hazards
Improved maintenance	Reduced property damage by improving preventive maintenance	Lower worker exposures to hazardous products
Creates a safer working environment		

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References

Image 1 Courtesy: "[https://thenounproject.com/-Housekeeping by Ramakrishna Venkatesan from the Noun Project](https://thenounproject.com/-Housekeeping)"

Image 2 Courtesy: "[https://thenounproject.com/Laundry by Made from the Noun Project](https://thenounproject.com/Laundry)"

Image 3 Courtesy: "[https://thenounproject.com/Mop by Eucalyp from the Noun Project](https://thenounproject.com/Mop)"

11 tips for effective workplace housekeeping available at

https://www.safetyandhealthmagazine.com/articles/12470-tips-for-effective-workplace-housekeeping

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Microsoft Word - Housekeeping- Benefits-011.doc available at

https://d1hks021254gle.cloudfront.net/wp-content/uploads/sites/11/2016/12/Housekeeping-__Benefits-011.pdf

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QUALITY CIRCLES

Quality circle is described as a small group of employees who willingly cooperate to solve problems related to:

Production, wastage of materials	Quality of raw material, tool, semi-finished and finished goods	Work environment, energy consumption
Scheduling, delay	Maintenance	Safety

CHARACTERISTICS OF QUALITY CIRCLES

- Group of 6-8 members
- Voluntary membership
- Trained in Problem-Solving & Analysis Techniques
- Work for Improving Qualities and Productivity

Quality Circles

Objectives

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The objectives of Quality Circles are multiple and it's important to understand what they are trying to achieve beyond just continual improvement in the quality of work output.

This is reflected in some of the softer skills that are required in establishing and running Quality Circles.

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Attitude

The main focus is pointed towards change in attitude from *"I don't care"* to *"I do care"*

Through humanization of work the quality of work life improves

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Self-Development

Bringing out the hidden potential of people through operational activities such as leadership, critical thinking, analysis and problem-solving

The softer side of self-development is team members learning from one another by discussion and the workplace becomes a place where both hands and minds are used to improve the service.

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Team Spirit

Quality Circle teams record elimination of internal operational 'silos' and the elimination of interdepartmental conflicts.

It is not always an easy process and teams are challenged and stretched beyond their comfort zone promoting energy and excitement.

Team spirit is enhanced as members feel that they are meaningfully contributing to the bigger picture.

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Organisational Culture

Wider organization benefits are gained from an improved organizational culture and a positive working environment, in particular

Visible management support encourages the staff to not only perform better within the Quality Circle but also in their day-to-day roles, fostering greater cooperation across all levels of the organisation.

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Quality Improvement

Quality Circles are designed to achieve more effective and efficient work processes, making work easier, smarter and faster

Quality Circles are shown to be extremely effective in bringing quantum leaps in service quality, operating efficiency and process effectiveness along with concomitant levels of savings

Quality improvement initiatives are often too far removed from where Quality is actually delivered, which is the hardest part of operations

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Reference

- Objectives and Quality Improvement available at https://workplacefundi.com/2017/03/08/quality-circles-implementing-the-improvement/

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QUALITY CONSCIOUSNESS

Quality

The term " quality" is used to refer to the standard of something as measured against other things of a similar kind; the degree of excellence of something.

The quality movement can trace its roots back to medieval Europe, where workers began forming unions called guilds in the late 13th century.

These guilds developed strict rules for product and service quality.

Inspection committees started marking best quality goods with a special mark or symbol.

Quality is a distinctive attribute or characteristic possessed by someone or something

Meaning of Quality

Quality refers to how good something is compared to other similar things. In other words, its degree of excellence.

The common element of the business definitions quality can be defined as the state of a product or service meeting customer's expectations.

Quality has no specific meaning unless related to a specific function and/or object.

Key aspects of Quality

Important aspects of quality are rooted into business through **Quality Management**.

- Quality Planning
- Quality Assurance
- Quality Control
- Quality Improvement

Quality- Definitions

The business meanings of *quality* have developed over time. Various interpretation can be as mentioned below:

- **American Society for Quality**: "Characteristics of a product to satisfy the customer"

- **Subir Chowdhury**: "Quality combines people power and process

Quality- Definitions

Various interpretation can be as mentioned below:

- **Joseph M. Juran**: "Fitness for use."

- **Noriaki Kano and others**, present a two-dimensional model of quality: "must-be quality" and "attractive quality."

- **Robert Pirsig**: "The result of care".

- **Six Sigma**: "Number of defects per million opportunities."

What is Quality Characteristics

- Each characteristic is distinguishing feature of the product (service).

- The term **quality** characteristic is defined in the standard as inherent characteristic of a product, process or system related to a requirement.

- The **Quality Characteristics** can also be called as Quality Dimensions.

- **The quality characteristics are classified into two major parameter:**
    (i) Quality of design and
    (ii) Quality of conformance

Dimensions of quality

Eight dimensions of product quality management can be used at a strategic level to analyze quality characteristics. Davis A. Garvin's eight dimensions can be summarized as follows:

1.Performance

- Performance refers to a product's primary operating characteristics.
- This dimension of quality involves measurable attributes; brands can usually be ranked objectively on individual aspects of performance

2.Features

- Features are additional characteristics that enhance the appeal of the product or service to the user.

Dimensions Of Quality

Reliability
- Reliability is the likelihood that a product will not fail within a specific time period.
- This is a key element for users who need the product to work without fail.

Conformance
- Conformance is the precision with which the product or service meets the specified standards.

Durability
- Durability measures the length of a product's life.
- When the product can be repaired, estimating durability is more complicated.
- The item will be used until it is no longer economical to operate it. This happens when the repair rate and the associated costs increase significantly.

Dimensions Of Quality

Serviceability
- Serviceability is the speed with which the product can be put back into its working condition when it breaks down, as well as the competence and the behavior of the service person.

Aesthetics
- Aesthetics is the subjective dimension indicating the kind of response a user has to a product. It represents the individual's personal preference.

Perceived Quality
- Perceived Quality is the quality attributed to a good or service based on indirect measures.

Dimensions Of Quality

Connectivity
- The ease with which an interface can be created with another information system or within the information system, and can be changed.

Continuity

The continuity quality characteristic can be split into characteristics that can be applied in sequence, in the event of increasing disruption of the information system:
- Reliability
- Robustness
- Recoverability
- Degradation factor
- Fail-over possibilities

Synopsis

Mentioned were some of the Characteristics monitored to understand the quality of a product.

Generally, it can be said that product is of satisfactory quality, for the consumers/user. The consumer will buy a product or service only if it suits their requirements.

Quality can also be either a written or non-written promise/commitment to a consumer by the producer.

Therefore, consumers' requirements are first assessed by marketing department and then the quality decision is taken on the basis of the information collected.

QUALITY MANAGEMENT SYSTEM

- Quality Management System (QMS) is defined as a certified system that records processes, procedures, and responsibilities for achieving quality policies and objectives. A QMS helps synchronize and direct an organization's activities to meet customer and regulatory requirements and improve its effectiveness and efficiency on a constant basis.

PURPOSE OF QUALITY MANAGEMENT

- Determining, improving, and controlling processes
- Reducing waste
- Preventing mistakes
- Lowering costs
- Facilitating and identifying training opportunities
- Engaging staff
- Setting organization-wide direction
- Communicating a readiness to produce consistent results

ISO 9000

- ISO 9000 is defined as a set of international standards on quality management and quality assurance developed to help companies effectively document the quality system elements needed to maintain an efficient quality system. They are not specific to any one industry and can be applied to organizations of any size.

https://asq.org/quality-resources/iso-9000

ISO 9000 series of Standards

- The ISO 9000 family contains these standards:

- ISO 9001:2015: Quality Management Systems - Requirements

- ISO 9000:2015: Quality Management Systems - Fundamentals and Vocabulary (definitions)

- ISO 9004:2018: Quality Management - Quality of an Organization - Guidance to Achieve Sustained Success (continuous improvement)

- ISO 19011:2018: Guidelines for Auditing Management Systems

https://asq.org/quality-resources/iso-9000

BIS SYSTEMS

- The **Bureau of Indian Standards** (**BIS**) is the national Standards Body of India working under the aegis of Ministry of Consumer Affairs, Food & Public Distribution, Government of India. It is established by the Bureau of Indian Standards Act, 1986 which came into effect on 23 December 1986.[2] The Minister in charge of the Ministry or Department having administrative control of the BIS is the ex-officio President of the BIS.

- FSSAI has set certain guidelines for food safety research. The Research and Development division is responsible for research with the following objectives:

1. Generate new knowledge that would help in continuously updating and upgrading food safety standards which are compatible with international organizations

2. Carry out evidence based studies for improving or building policies.

- The organization was formerly the **Indian Standards Institution** (**ISI**), set up under the Resolution of the Department of Industries and Supplies No. 1 Std.(4)/45, dated 3 September 1946. The ISI was registered under the Societies Registration Act, 1860.

- A new **Bureau of Indian standards (BIS) Act 2016** which was notified on 22 March 2016, has been brought into force with effect from 12 October 2017. The Act establishes the Bureau of Indian Standards (BIS) as the National Standards Body of India.

- As a corporate body, it has 25 members drawn from Central or State Governments, industry, scientific and research institutions, and consumer organizations. Its headquarters are in New Delhi, with regional offices in Eastern Region at Kolkata, southern Region at Chennai, Western Region at Mumbai, Northern Region at Chandigarh and Central Region at Delhi and 20 branch offices. It also works as WTO-TBT enquiry point for India.

https://en.wikipedia.org/wiki/Bureau_of_Indian_Standards

FUNCTIONS OF BIS

1. Protecting customers from dangerous products.
2. Promoting consumer confidence.
3. Providing a safeguard to the public health.
4. Providing quality assurance

QUALITY TOOLS

QUALITY TOOLS

- **Graphical** techniques

- Identify **issues** in process of manufacturing etc.

- Identify product **quality issues**

- Help in **resolving** problems

- Help in **improving** processes

PIONEERS OF QUALITY TOOLS

W. Edwards Deming

Kaoru Ishikawa

7 QC TOOLS

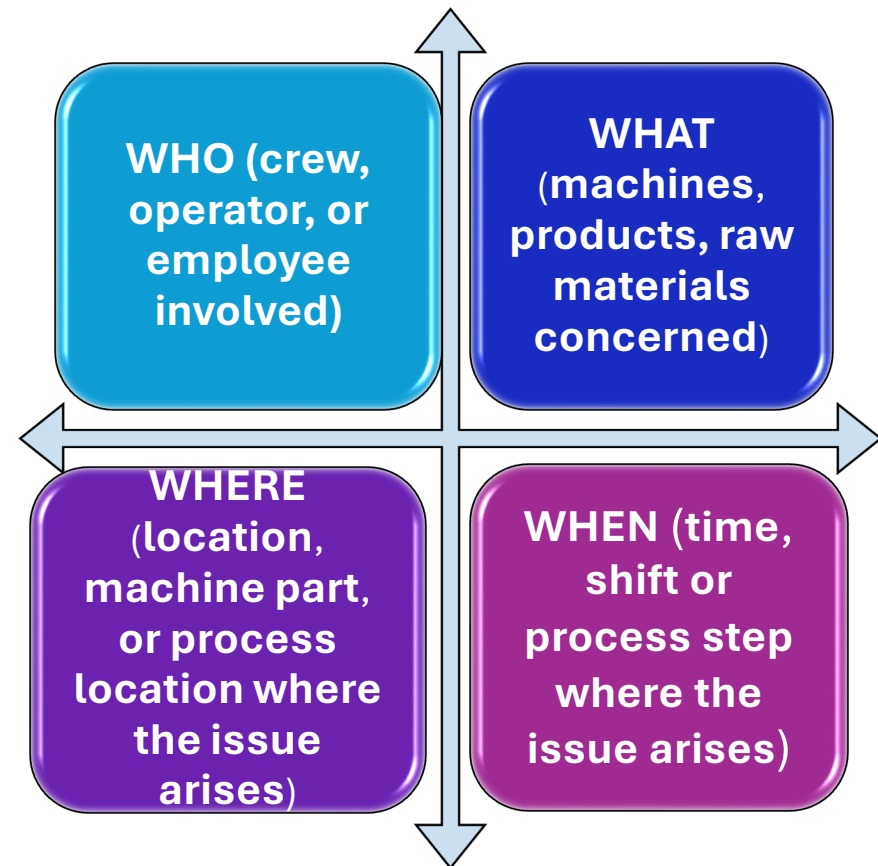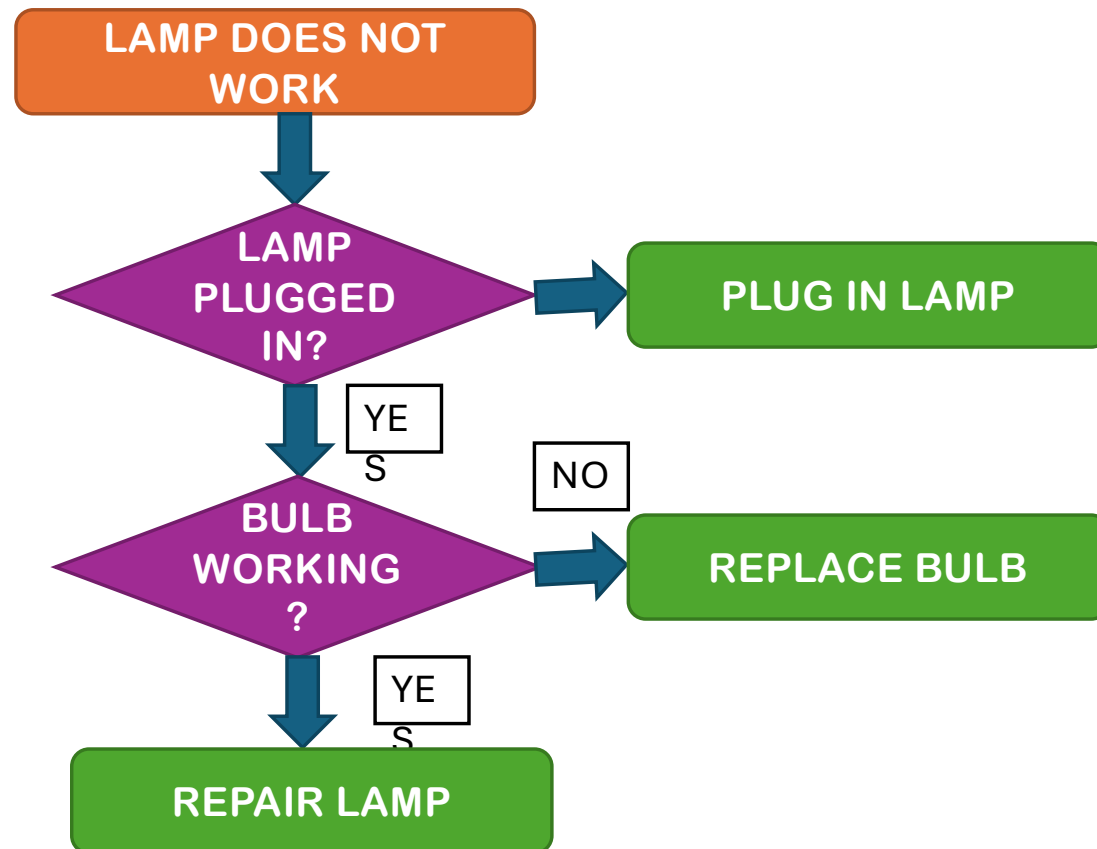| Stratification (Divide and Conquer) | Histogram | Check sheet (tally sheet) | Ishikawa (fishbone) diagram | Pareto Chart(80/20 chart) | Scatter diagram | Control Chart |

STRATIFICATION (FLOW CHART AND/OR RUN CHART)

- **Sequence** of events

- **Divides** entire process into smaller **groups**

- Helps to understand at **which part** the issue lies

WHO (crew, operator, or employee involved)

WHAT (machines, products, raw materials concerned)

WHERE (location, machine part, or process location where the issue arises)

WHEN (time, shift or process step where the issue arises)

FLOW CHART AND/OR RUN CHART EXAMPLE:

HISTOGRAM:

Let us take an example.

- Mr. Biswas is a manager at a local bank.

- He is receiving reports that the average waiting time of customers is quite high.

- He wants to understand the range of the highest waiting time.

- He can use an HISTOGRAM for the same.

HISTOGRAM:

WAITING TIME IN MINUTES FOR 20 CUSTOMERS	
43.1	42.2
35.6	45.5
37.6	30.3
36.5	31.4
45.3	35.6
43.5	45.2
40.3	54.1
50.2	45.6
47.3	36.5
31.2	43.1

HISTOGRAM:
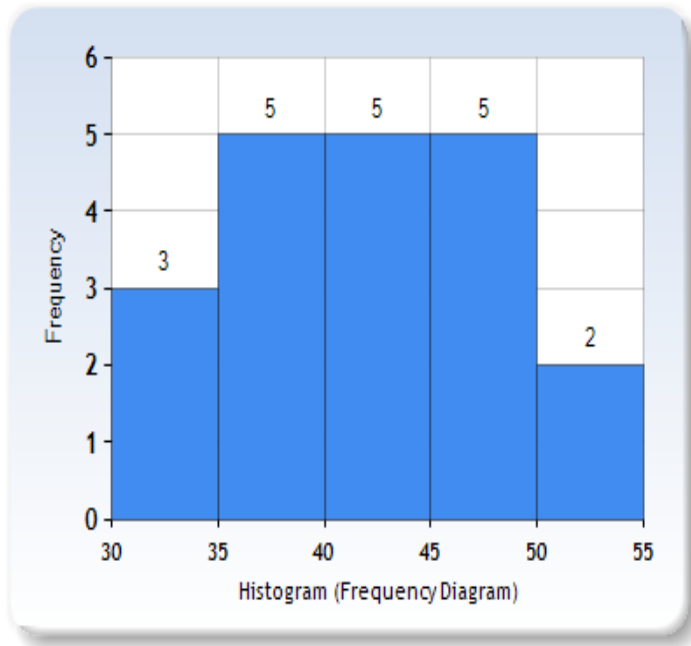
Data distribution	
Range of time (mins)	Count of customers
30-34.9	3
35-39.9	5
40-44.9	5
45-49.9	5
50-54.9	2

So, maximum customers' waiting time falls within 35.1 and 50 minutes.

CHECK SHEET/TALLY SHEET:

- A **sheet** or form

- Collects data by **counting**

- Counts **frequency** of events

- Uses data to make a
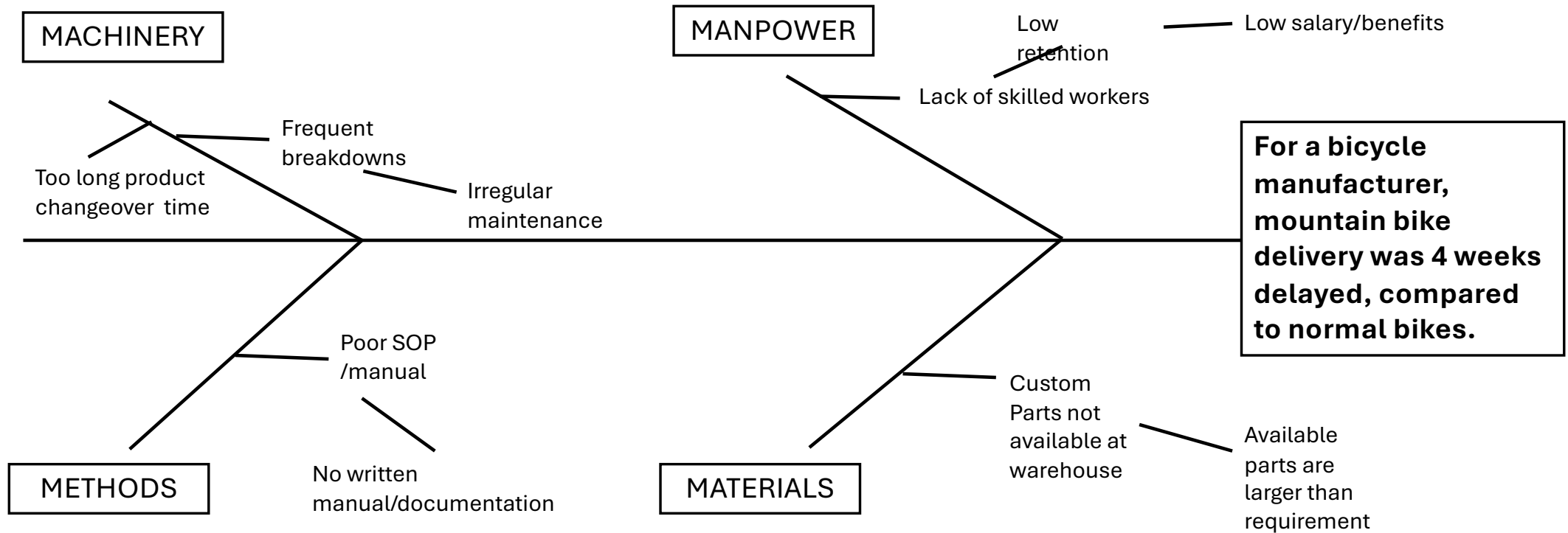
  histogram/pareto chart

Causes of bed not available in a hospital	Tally	Total
No cleaner to clean up ward	‖‖	3
Delay in investigation and patient occupying bed needlessly	‖‖	4
All beds full	‖	2
Total	‖‖‖‖‖	9

ISHIKAWA (FISHBONE) DIAGRAM:

- Looks like a **fish skeleton**

- Talks about **cause** and **effect** relationship

- Identifies cause of **problems**

- Tries to focus on the possible **solution**
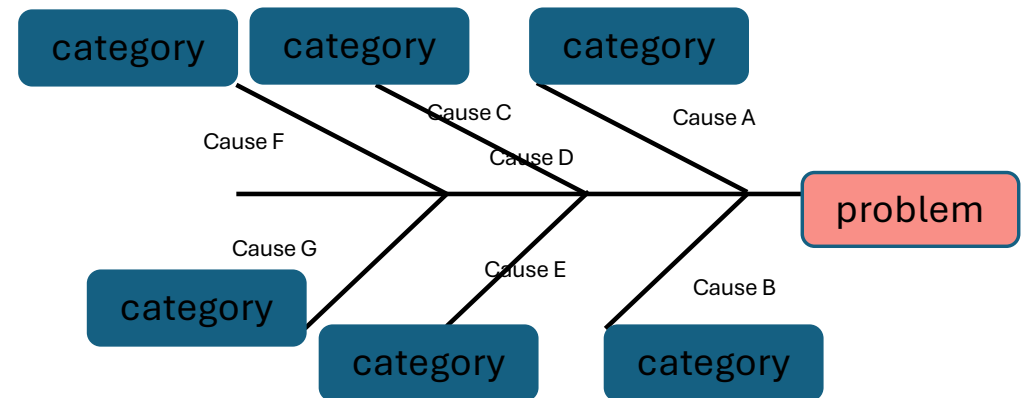
Problem statement: For a bicycle manufacturer, mountain bike delivery was 4 weeks delayed, compared to normal bikes.


MACHINERY

Too long product changeover time

Frequent breakdowns

Irregular maintenance

MANPOWER

Low retention

Low salary/benefits

Lack of skilled workers

For a bicycle manufacturer, mountain bike delivery was 4 weeks delayed, compared to normal bikes.

METHODS

Poor SOP /manual

No written manual/documentation

MATERIALS

Custom Parts not available at warehouse

Available parts are larger than requirement

PARETO CHART (80/20 DIAGRAM)

- Principle : **80% of issues** arises from **20%** of **causes**

- Contains a **bar/column** graph and a **line** graph together

- Helps to **understand** the **major** cause

- Helps to **resolve** the **major problem** in a **process**
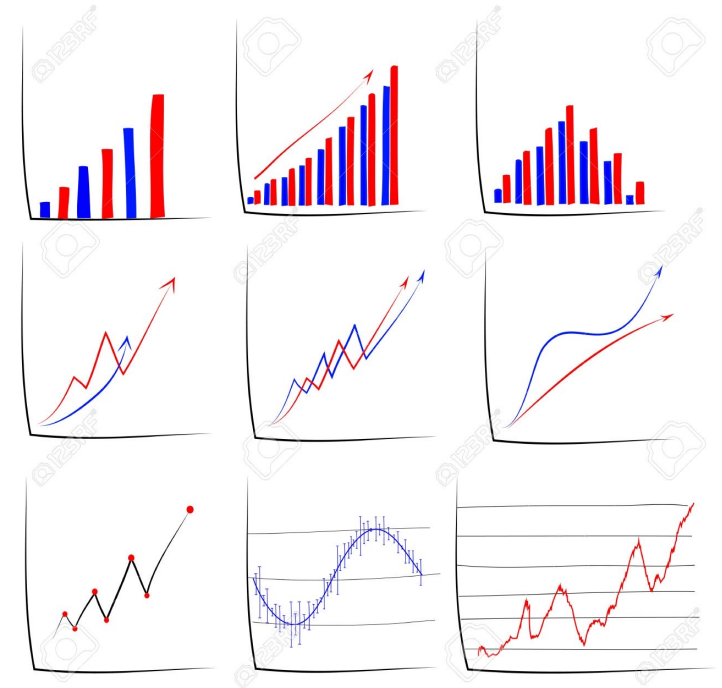
Case Study : **Reasons why "Rush-eat" food delivery company is late in delivering customer orders**

Reason	Frequency in a month	Percentage of total
Outlet is slow in preparing food	4	=(4/20)*100 = 20
Traffic conditions	2	10
Delivery person unfamiliar with roads	7	35
Technical glitch	2	10
Staff count not enough	5	25
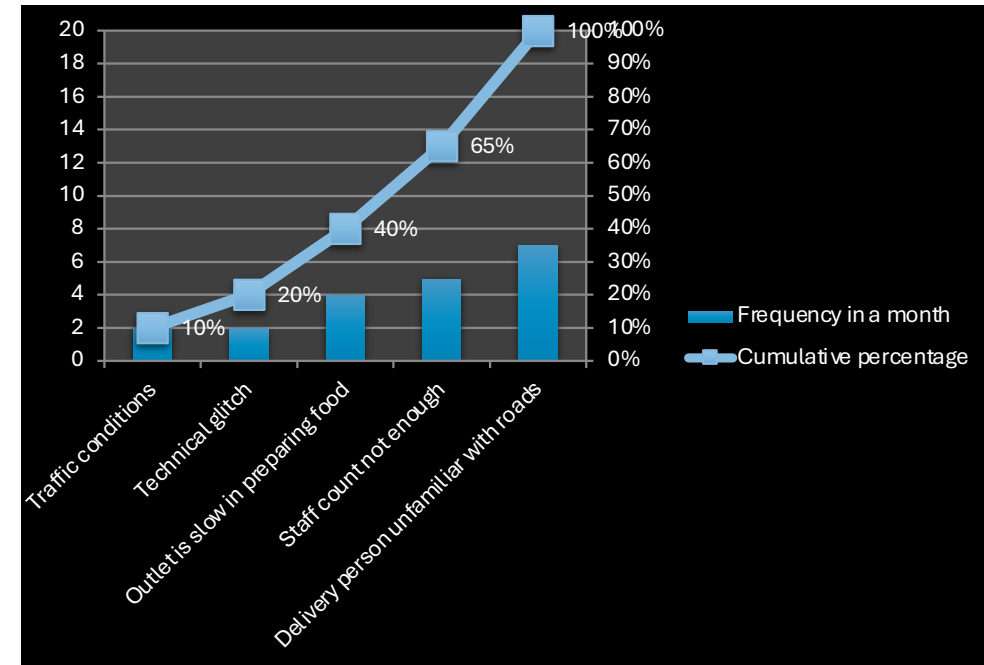
So, insufficient staff, staff unfamiliar with routes and technical glitches cause *80%* of the problems. **WHAT CAN BE THE SOLUTION?**

SCATTER DIAGRAM

- Takes 2 **variables**

- **Independent** one on the **x** axis,

  dependent one on the **y** axis

- Shows **relationship** between the factors
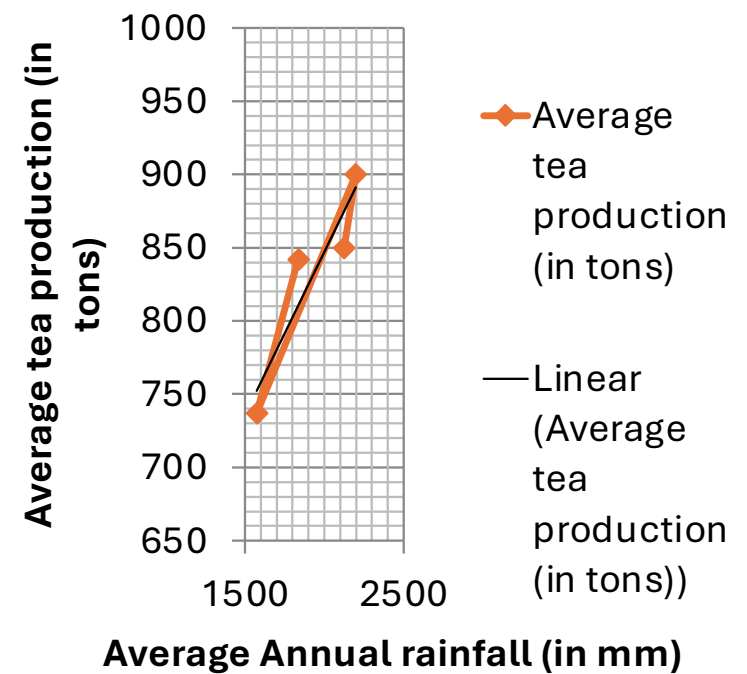
- Can be a **line** graph, **bubble** graph etc.
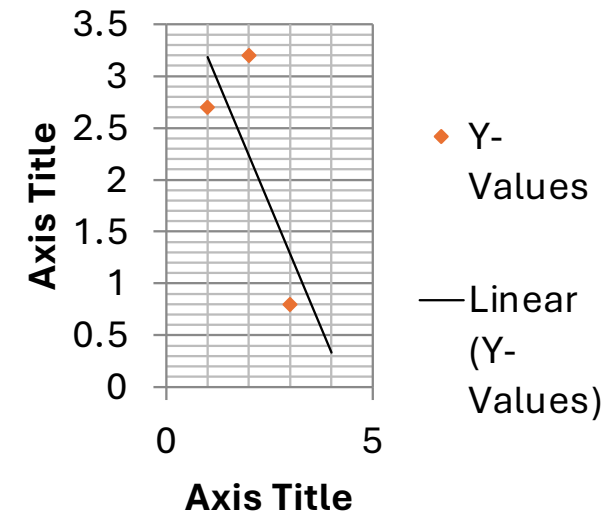
Let us consider how annual rainfall influences tea production in the state of Assam, India.

Note: **All figures are for demonstration purpose.**

Year	Average Annual rainfall (in mm)	Average tea production (in tons)
2015	2125	850
2016	2198	900
2017	1574	737
2018	1836	842

So, INCREASED RAINFALL CAUSES INCREASED PRODUCTION.

CONTROL CHART/ SHEWART CHART

- Tracks value of a **process over time**

- **Time** on **X-axis**

- **Measurement** on **Y-axis**

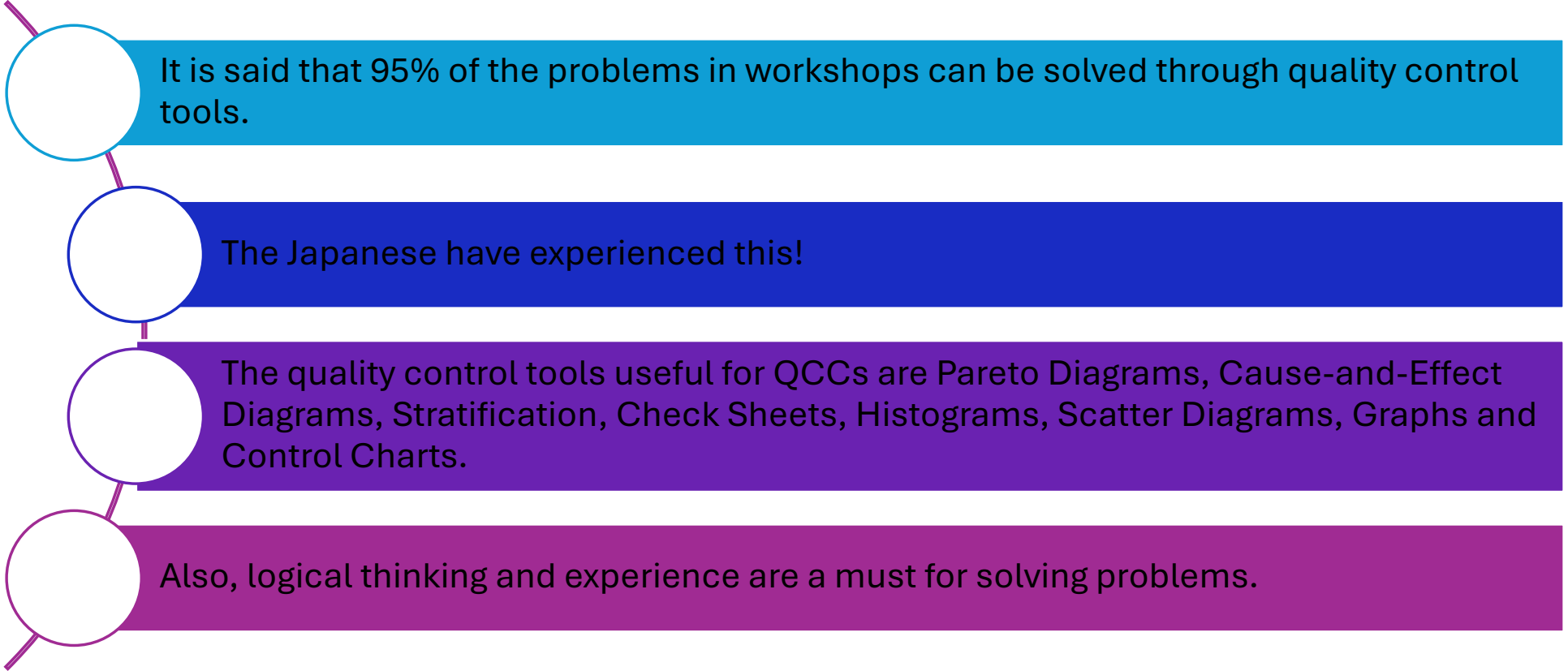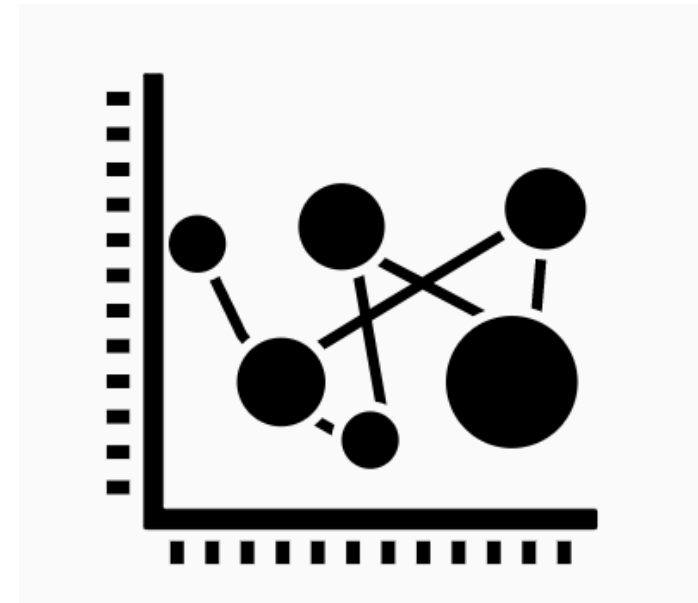- **Indicates** stability or reliability of a process

Image courtesy : https://thenounproject.com/term/control-chart/2036306/

License : https://creativecommons.org/licenses/by/3.0/

Quality

ROLES
&
FUNCTIONS
OF
QUALITY CIRCLES

Quality Circle

A **Quality Circle** or **Quality Control Circle** is a group of workers who do the same or similar work, meet regularly to identify, analyze and solve work-related problems.

Functions & Roles

It is said that 95% of the problems in workshops can be solved through quality control tools.

The Japanese have experienced this!

The quality control tools useful for QCCs are Pareto Diagrams, Cause-and-Effect Diagrams, Stratification, Check Sheets, Histograms, Scatter Diagrams, Graphs and Control Charts.

Also, logical thinking and experience are a must for solving problems.

Functions & Roles

Promote leadership qualities

Promote job involvement

Create problem-solving capability

Improve communication

Functions & Roles

Develop a greater awareness for cleanliness

Develop a greater awareness of safety

Reduce errors

Enhance Quality

Functions & Roles

Inspire more effective teamwork

Build an attitude of problem prevention

Promote cost reduction

Improve productivity

Functions & Roles

Reduce downtime of machines and equipment

Increase employee motivation

Promote personal development

Improve morale through the closer identity of employee objectives

Develop a harmonious manager, supervisor and worker relationship