GEPM 375

Project Planning and Construction Management

Project Quality

Project Quality

What we discussed in the last class?

- What is project quality?
- Ensuring project quality.
- Importance of quality management.
- What is a quality product.
- Managing a quality product.
- Functions and Actions needed for quality product,
- ISO & BSTI

What we are going to discuss today?

- **Important terms** – related to quality.
  -Quality audit
  -Quality reviews
- **Cause and Effect Analysis**

Example – cause and effect analysis

- **Trend analysis**.

Quality Audit

•A **periodic check** that the **quality procedures set out** in the quality plan have been **carried out**.

•Where an organization is **officially registered as being in compliance with a specific quality standard** such as ISO 9000, an **annual audit by an independent authority** may be carried out **to ensure that the standards are still being met.**

Quality Reviews:

•A **periodic review** of the **quality standards**, **procedures and processes** to ensure their applicability to current requirements.

•As part of review processes, existing, proposed or new **suppliers and contractors have to confirm their compliance** with quality assurance procedures.

Cause and Effect Analysis (what it is?)

- **Select certain (usually critical) items** and
- **Identify all possible modes of failures** which could occur during its life cycle.
- **Probability, cause, impact of such failures** are then **assessed** and necessary **controls and rectification processes put in place**.
- If the **possible modes of failure are more,** then if necessary, **change the design**.





Example: Techniques can be applied to find the main causes affecting the probability of a **'Domestic Vacuum Cleaner'.**

Step-1:

- **List down all of the main causes** which are generally experienced when using such a machine.

- May **require the brain storming** session to generate the causes.

- **Causes are**:

  -Electrical

  -Physical (weight and size)

  -Mechanical (brush wear)

  -Suction (dust collection)

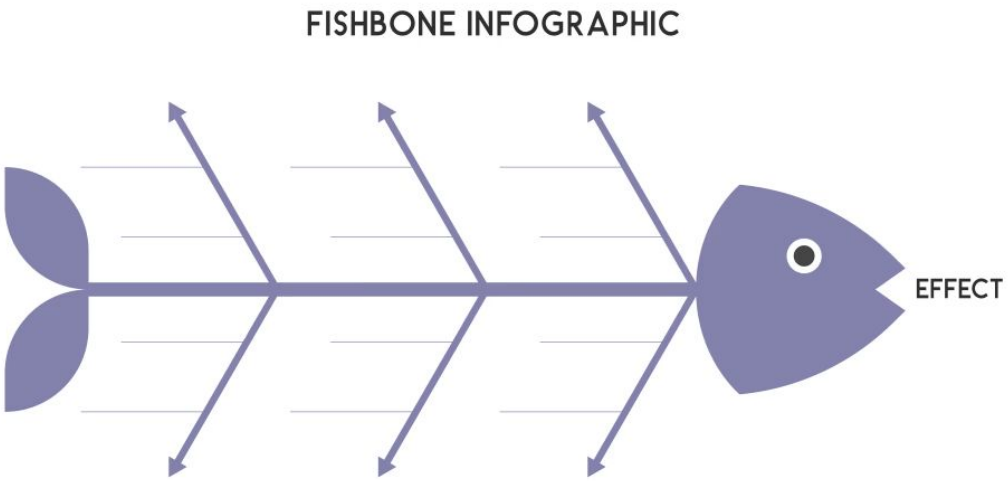


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Step-2

- Draw the **cause and effect diagram**, known *as* ***Ishikawa*** **or** ***fishbone*** diagram.

- From this diagram, it is possible to **see clearly how these causes affect the operation of the vacuum cleaner.**

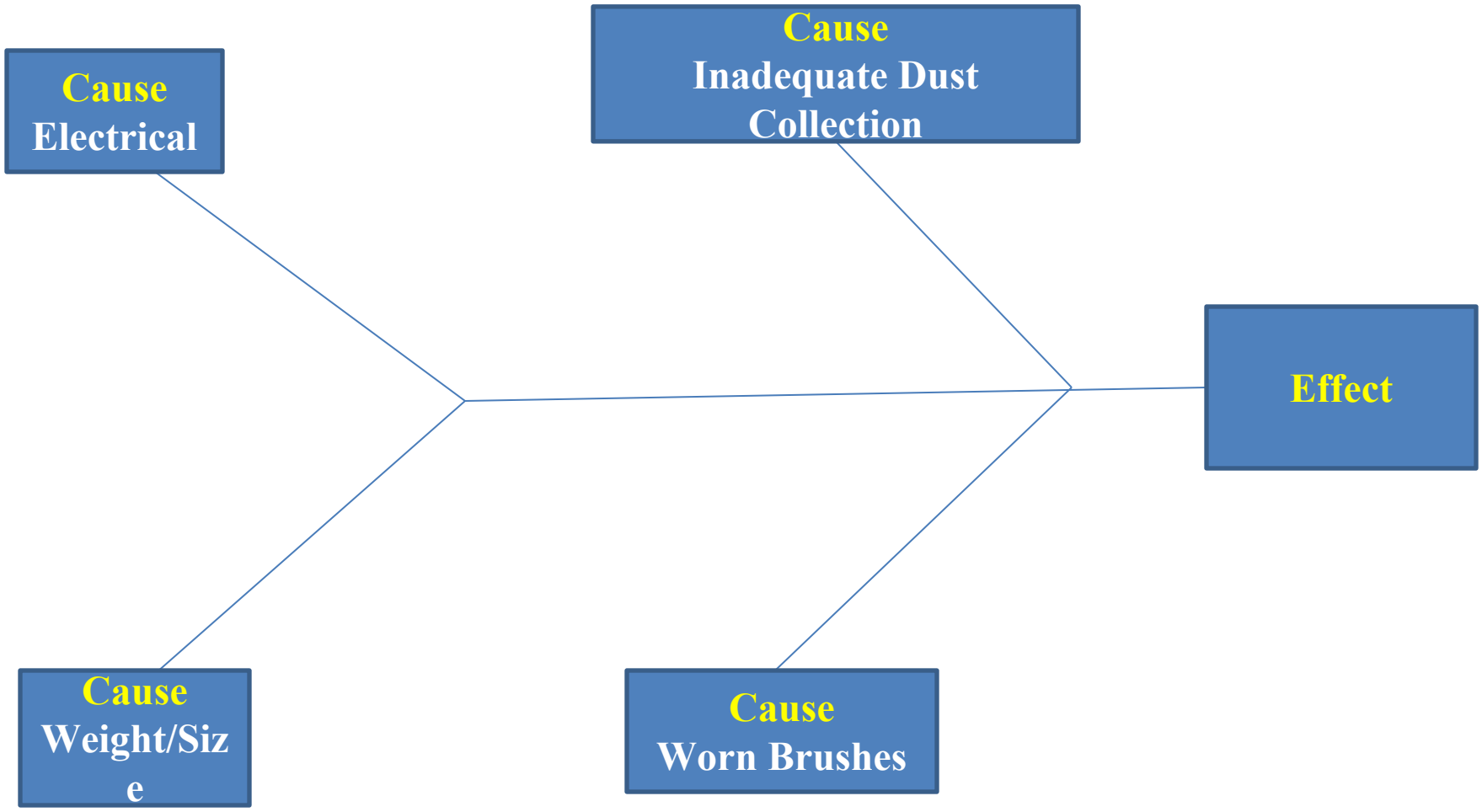


Kaoru Ishikawa (July 13, 1915 – April 16, 1989) was a **Japanese Organizational theorist.**

- Professor at the **Faculty of Engineering** at The University of Tokyo, noted for his **quality management innovations**.

- He is considered a key figure in the **development of quality initiatives** in Japan.

- He is best known outside Japan for the **Ishikawa or cause and effect diagram (also known as fishbone diagram)** often used in the analysis of industrial process.


Cause
Electrical
Cause
Inadequate Dust
Collection
Effect
Cause
Weight/Siz
e
Cause
Worn Brushes

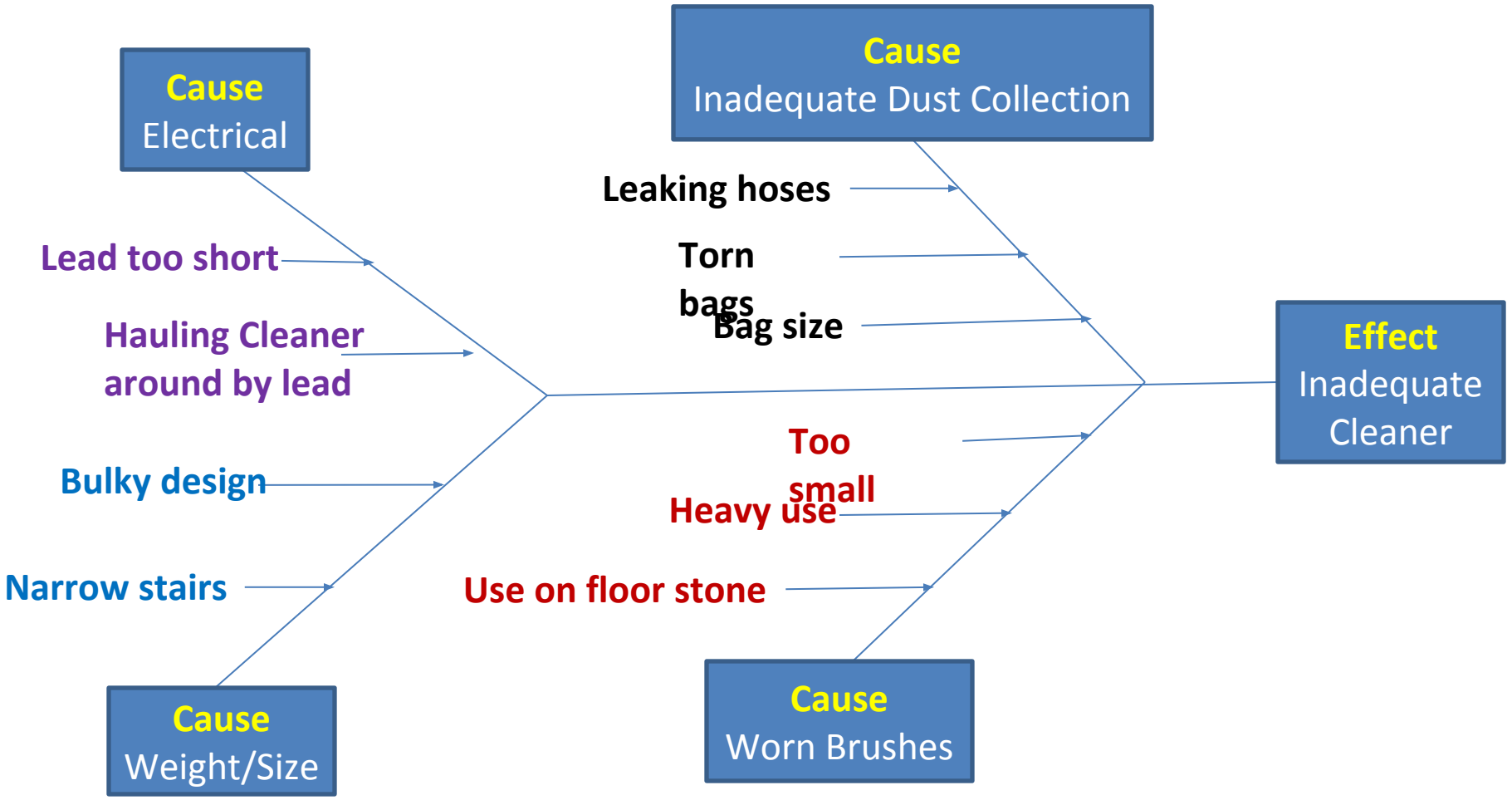
Step -3

- All the **sub-causes of main cause to be written** against the tributary lines (or fish-bones) of each cause.

- **Example**: the sub-cause of electric failure are:

  (i) the **lead being too short**, thus pulling the plug out of the socket, or

  (ii) hauling the cleaner by the lead and causing a break in the cable.


Cause
Electrical
Lead too short
Hauling Cleaner around by lead
Bulky design
Narrow stairs
Cause
Weight/Size
Cause
Inadequate Dust Collection
Leaking hoses
Torn bags
Bag size
Too small
Heavy use
Use on floor stone
Cause
Worn Brushes
Effect
Inadequate Cleaner

Step - 4

- **Assess** the **number of times, over a measured period,** each cause has resulted in a failure.

- **Concentration can be done on those causes** which are responsible for the most complaints.

- Assessment can be done by ***Pareto Analysis***.

Pareto Analysis:

- **Vilfredo Pareto**, Italian economist and sociologist, in 19th century.

- Discovered that in Italy, **90% of income was earned by 10% of the population.**

- Further study shows, that this **distribution, was also true for many other situations** from political power to industrial problem.

Pareto's Law:

- 'In any series of elements to be controlled, **a small fraction in terms of the number of elements always account for a large fraction in terms of effect'.**

Case of Vacuum Cleaner:

- A failure table is prepared as % figure that can be calculated by **tabulating the causes and number of times they resulted** in a failure over a given period (say 1 year), and then **converting these into a %** of the total number of failures.

- In general, only a **relative a small number of causes are responsible for the most serious effects**.

- Survey of faults in Failure table shows that out of 50 failures, the **four main causes examined**, **inadequate dust collection is responsible for 76% (nearly 80%) of the failures** or **cor**

- This is why, **Pareto's Law is sometimes called 80/20 rule**.

Cause	No. of failures	% of failures
Electrical	6	12
Physical	2	4
Mechanical	4	8
Suction	38	76
Total	50	100

Failure table

- In the **Pareto Chart**, if the **impact Y,** in terms of % of problems encountered are plotted against the number of **causes X, identified.**

- Shows 76% dust collection causes most of the failures of vacuum cleaner.

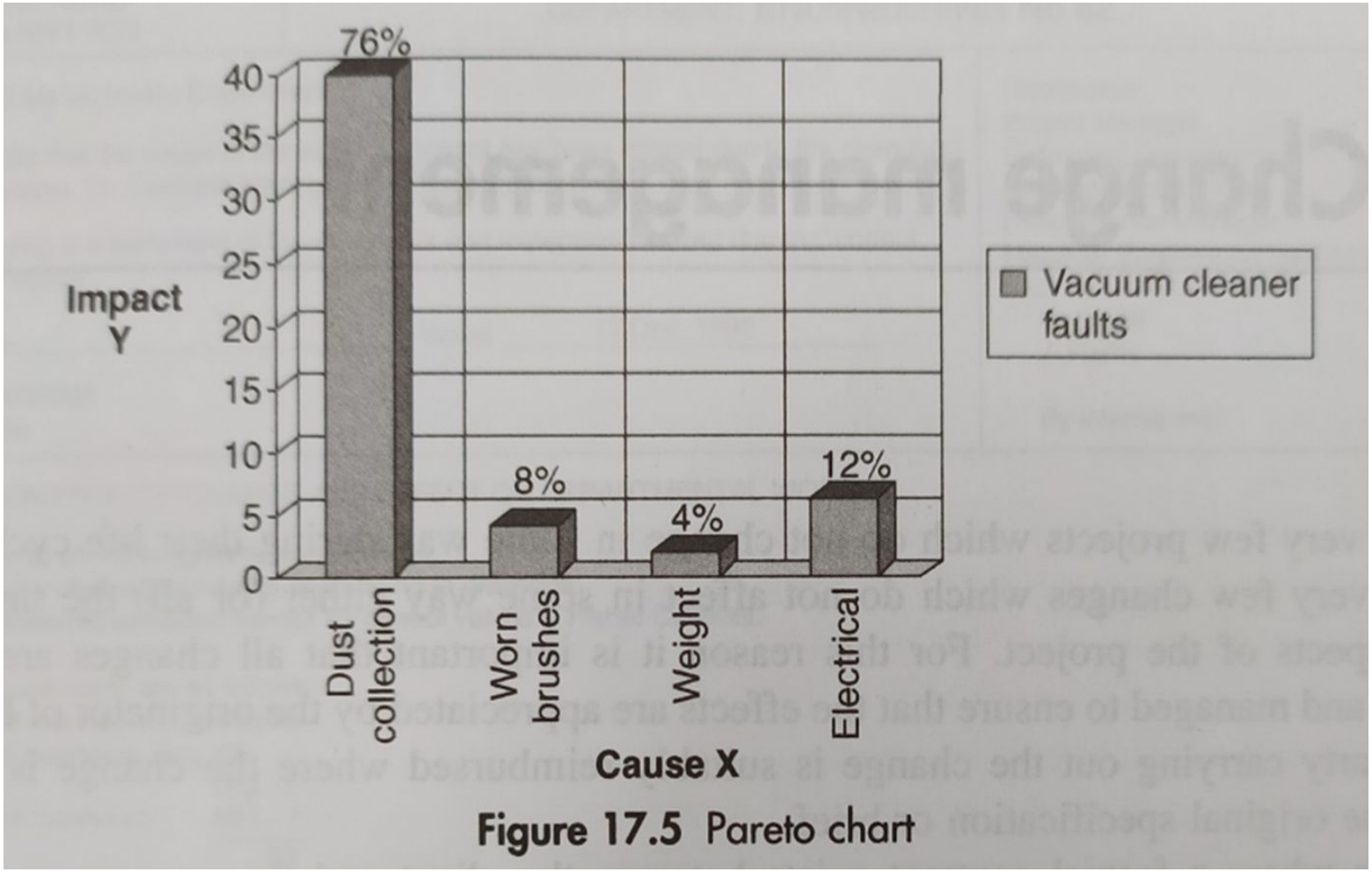


Figure 17.5 Pareto chart

Trend analysis:

- **Part of Project Control process** is to issue regular reports which **log:**
  - **nonconformance,**
  - **accepted or non accepted variances,**
  - **delays,**
  - **cost overruns or**
  - **other problems.**

- If these reports are **viewed on regular basis**, **trends may be found out**.

If trends are considered to be adverse, can be addressed by taking appropriate corrective action.

If trends are **considered to be opportunity,** can be taken to check:

- whether there has been a **deficiency in the procedures** or documents, and
- whether other **components are affected**.

- **Cause and source of a failure has to be identified** which may require a review of all the suppliers and subcontractors involved.

Thank You