**IENG112**

**Notes #10**

**Quality Control/Tools of QC**

**1. Histogram:** Shows the diversity of a parameter

Make a histogram from the data:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0.44 | 0.53 | 0.50 | 0.46 | 0.55 |
| 0.48 | 0.58 | 0.53 | 0.43 | 0.54 |
| 0.47 | 0.54 | 0.48 | 0.50 | 0.41 |
| 0.49 | 0.42 | 0.46 | 0.46 | 0.64 |
| 0.59 | 0.65 | 0.56 | 0.46 | 0.50 |

**2. Pareto Analysis:** Shows frequency/importance of errors

|  |  |  |  |
| --- | --- | --- | --- |
| *Error* | *Frequency* | Percentage | Total Percentage |
| A | 7 | 26.9230769 | 26.9230769 |
| B | 3 | 11.5384615 | 38.4615385 |
| C | 3 | 11.5384615 | 50 |
| D | 3 | 11.5384615 | 61.5384615 |
| E | 2 | 7.69230769 | 69.2307692 |
| F | 2 | 7.69230769 | 76.9230769 |
| G | 1 | 3.84615385 | 80.7692308 |
| H | 1 | 3.84615385 | 84.6153846 |
| I | 1 | 3.84615385 | 88.4615385 |
| J | 1 | 3.84615385 | 92.3076923 |
| K | 1 | 3.84615385 | 96.1538462 |
| L | 1 | 3.84615385 | 100 |

*The logic of Pareto Analysis is the same as of ABC analysis.* First, concern is paid to the errors giving the first 80 percent.

**“Vilfredo Federico Damaso Pareto** (born *Wilfried Fritz Pareto*; Italian:  15 July 1848 – 19 August 1923) was an Italian [engineer](http://en.wikipedia.org/wiki/Engineer), [sociologist](http://en.wikipedia.org/wiki/Sociologist), [economist](http://en.wikipedia.org/wiki/Economist), political scientist and [philosopher](http://en.wikipedia.org/wiki/Philosopher). He made several important contributions to economics, particularly in the study of income distribution and in the analysis of individuals' choices.”

**Wikipedia**

Measures which can be used in Pareto analysis: number of defects, number of breakdowns, (total) length of the breakdowns.

**3. Scatter Plot:** Shows relation between measured quantities.

**Cause-and-Effect Relationship:** What is cause, what is effect? Are both of them effects?

**4. Cause-and-Effect Diagram/Fishbone Diagram/Ishikawa Diagram:** useful in locating the defect.

* Use team to build
* Brainstorming: potential causes of defects, evaluation later.
* The problem (statement) must be measurable.
* 3 to 6 main categories.
* For each main categories the list of causes are on subbones or sub-subbones.
* Selection of most important causes:
  + Repeated items. Identification.
  + Discuss each cause and use “expert knowledge”.
  + Team consensus for the importance of causes.
  + Up-date.

**5. Flowchart.** (Already mentioned in the discussion of technology: omelet basic.) Decisions and actions. Instruction in the case of defect.