

MAYNARD

Standard Practice: **Pareto Analysis**

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Series: Lean Workplace

Discipline: General

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Purpose: Pareto analysis to prioritize a list.

Cross-referenced MSPs: Setup Reduction MSP



Inputs Required:

Estimated Time (man days):

Outputs Expected:

Estimated Time (man days):

Total Time Required:

Legend	
 → Tool	 → Training

1.0 BACKGROUND

The Pareto Principle, also known as the 80/20 rule, separates the “vital few” from the trivial many. This principle has already found multiple applications in various business situations. For example:

- The ABC-type inventory control was set up to concentrate efforts on the items with the highest annual cost (A).
- The majority of defects found during a quality audit can normally be traced to one or two root causes.
- A manufacturer produces 1000 different parts, but only a few parts make up 80% of the total cost.

The Pareto Principle is most commonly used to analyze setup times and quality, but can be applied to any situation where both of the following circumstances apply:

- The data can be arranged into categories. Categories being the criteria for looking at the data (e.g., by time, location, type, or symptom).
- The rank of each category is important. Most improvement activities have limited resources; the effort should be concentrated on the most important problems and the most important causes.

2.0 PROCEDURE

1. Gather the necessary data to be analyzed. Examples include:
 - ◆ Setup times by machine type.
 - ◆ Number of defects by product type.
 - ◆ Volume of product by part number.
 - ◆ Inventory costs by material type.
2. Identify any potential problem areas and record their frequency of occurrence.
3. Sort the data into categories. As previously stated, categories can relate data according to time, type, location, machine, symptom, or personnel. It is a good idea to include an “other” column to catch anything that has been missed.
4. Construct a frequency table from the categorized data using the template provided in *Pareto.xls* (shown in the *Appendix*). The final table will list the data in order of significance.

Figure 1 shows an example of a completed template used to analyze setup times. The times are ranked within the chart according to Column B - Frequency or Time (min).

A	B	C	D
Description	Frequency or Time (min)	Cumulative Freq./Time	Cumulative Percent
Heat Treat	960	960	61%
Assembly	225	1185	75%
Cutting	114	1299	82%
Drilling	75	1374	87%
Axial Drilling	70	1444	92%
Misc. Machining	45	1489	94%
Radial Drilling	30	1519	96%
Boring	21	1540	98%
Pack	15	1555	99%
Plate	12	1567	99%
Face & Center	10	1577	100%
Total	1577		

A - Description of activity
 B - Frequency (volume) of occurrences or Time for activity
 C - Cumulative activity frequency/time
 D - Cumulative percent of activities

Figure 1 – Completed Template for Pareto Analysis

- Construct a Pareto Diagram and Cumulative Percentage Line to graphically demonstrate where the significant problems lie. *Pareto.xls* automatically creates these graphics after the frequency table is complete. *Figure 2* shows the diagram created with the data from *Figure 1*.

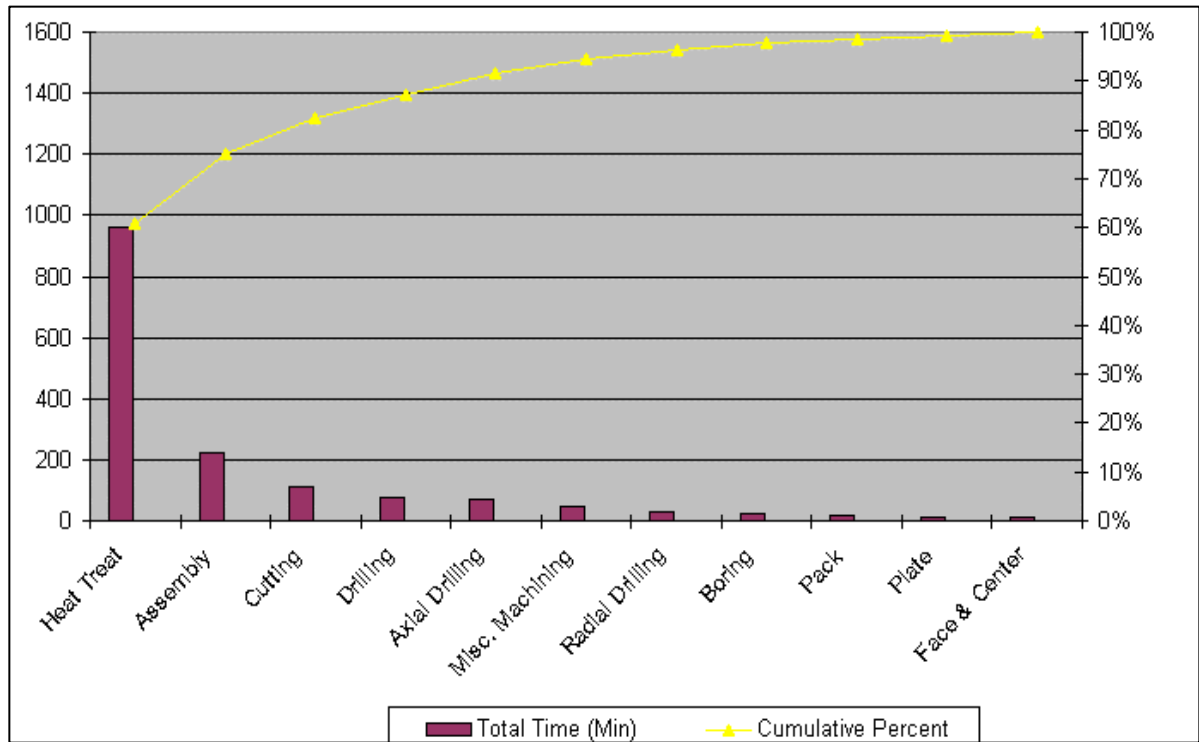


Figure 2 - Pareto Diagram

- Locate the point where the Cumulative Percentage line reaches 80%. This reveals which processes are responsible for 80% of the overall process.
- If there are large number of processes after the 80% is captured, the Pareto analysis may need to be performed again on those processes that fall within the 80% to further narrow the scope. This is an iterative process.

3.0 CONCLUSION

Pareto Analysis reveals the “vital few” causes of a problem, allowing a narrowed focus for study and investigation, which will have the greatest impact on the overall activity. Returning to the example for setup time, the first three setups listed in *Figure 1* account for more than 80% of the total setup time. Applying the *Setup Reduction MSP* to these three setups will have the greatest impact on total setup time.

4.0 REFERENCES AND RESOURCES

4.1 Examples

Examples of Pareto analysis from various client situations.

4.2 Templates/ Tools

Excel spreadsheet *Pareto.xls*.

4.3 References

QIP, Inc. and PQ Systems, Inc. *Improvement Tools*. June 1993

5.0 APPENDICES

Pareto.xls – template

