

OPER1160

Printed Circuit Board Assembly Data

The questions are: first, prepare a graph of the data and then state what the company tackle to improve the quality on this printed-circuit-board assembly line.

Steps to Follow:

- 1) First, notice how I added (a-g) labels to the defect descriptions...this makes it easier to work with as then you can use the letters instead of the long descriptions.
- 2) Now, rearrange the number of defects from highest to lowest number of occurrences.
- 3) Calculate the total of occurrences (1,275)

(Original Data) Defect Description <i>(Step 1 labelled a-g)</i>	Number of Defect Occurrences		
a. Components not adhering	143		
b. Excess adhesive	71		
c. Misplaced transistors	601		
d. Defective board dimension	146		
e. Mounting holes improperly positioned	12		
f. Circuitry problems on final test	90		
g. Wrong component	212		
<i>(Step 2): Rearranged Number of Defects in High to Low Number of Defect Occurrences</i>		<i>(Step 4) Defect Occurrences as a % of Total</i>	<i>(Step 5) Calculated the Cumulative Total</i>
Defect Description		% of Total	Cumulative %
c. Misplaced transistors	601	$601/1275=47.14\%$	47.14%
g. Wrong component	212	$212/1275=16.63\%$	63.77%
d. Defective board dimension	146	<i>...and so on</i> 11.45%	75.22%
a. Components not adhering	143	11.22%	86.44%
f. Circuitry problems on final test	90	7.06%	93.50%
b. Excess adhesive	71	5.57%	99.06%
e. Mounting holes improperly positioned	12	.94%	100%
<i>Total the occurrences (Step 3)</i>	1,275		

Figure 3: Data for Problem from Lopers et al, 2017 p. 105

- 4) Calculate each defect as a % of the total (take it out to two decimals)
- 5) Then find the cumulative total by adding the previous defect % until you reach 100%. Follow the arrow.
- 6) Now draw the Pareto Chart with 2 Y axes.

i) Label all four sides

Give it a title...Problem 13 Pareto Analysis

Left Side...Frequency (0 to highest # of occurrences...so more than 601)

Right Side...Cumulative % (at least 100%)

Bottom...Causes

ii) Plot the # of occurrences against the Frequency (left) axis from high (601) to low (12). Use bars centred over the corresponding Causes label. You can use the full description or the letter we assigned in the original chart (a-g). Remember, highest to lowest.

iii) Plot the cumulative % of defects with a line relating to the right hand Y axis and again aligning with the cause label at the bottom. Remember start at left and it rises to 100%.

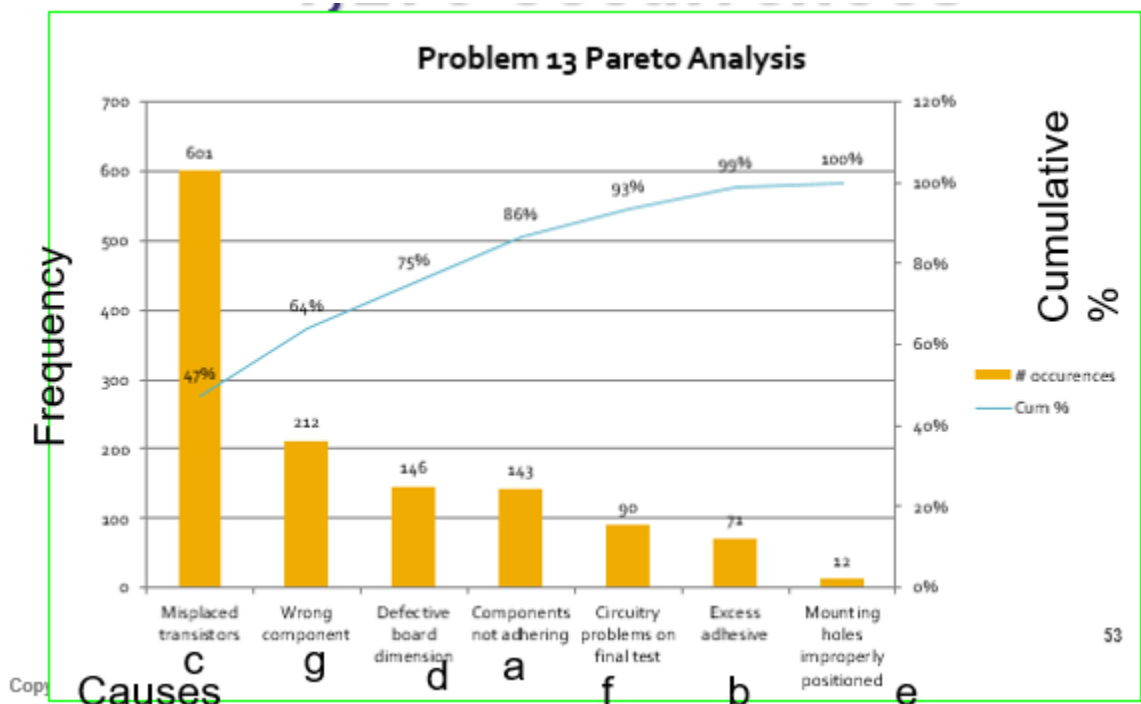


Figure 4: Pareto Chart for Answer adapted from Griffin (2017), p. 64.

Answer: To solve 64% of the problems, we recommend you should tackle the first 2 or 28% (that's 2/7) of the causes (misplaced transistors and using the wrong components).