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Homework #14 – Tools for Process Improvement

TECH 50000 - Quality Standards

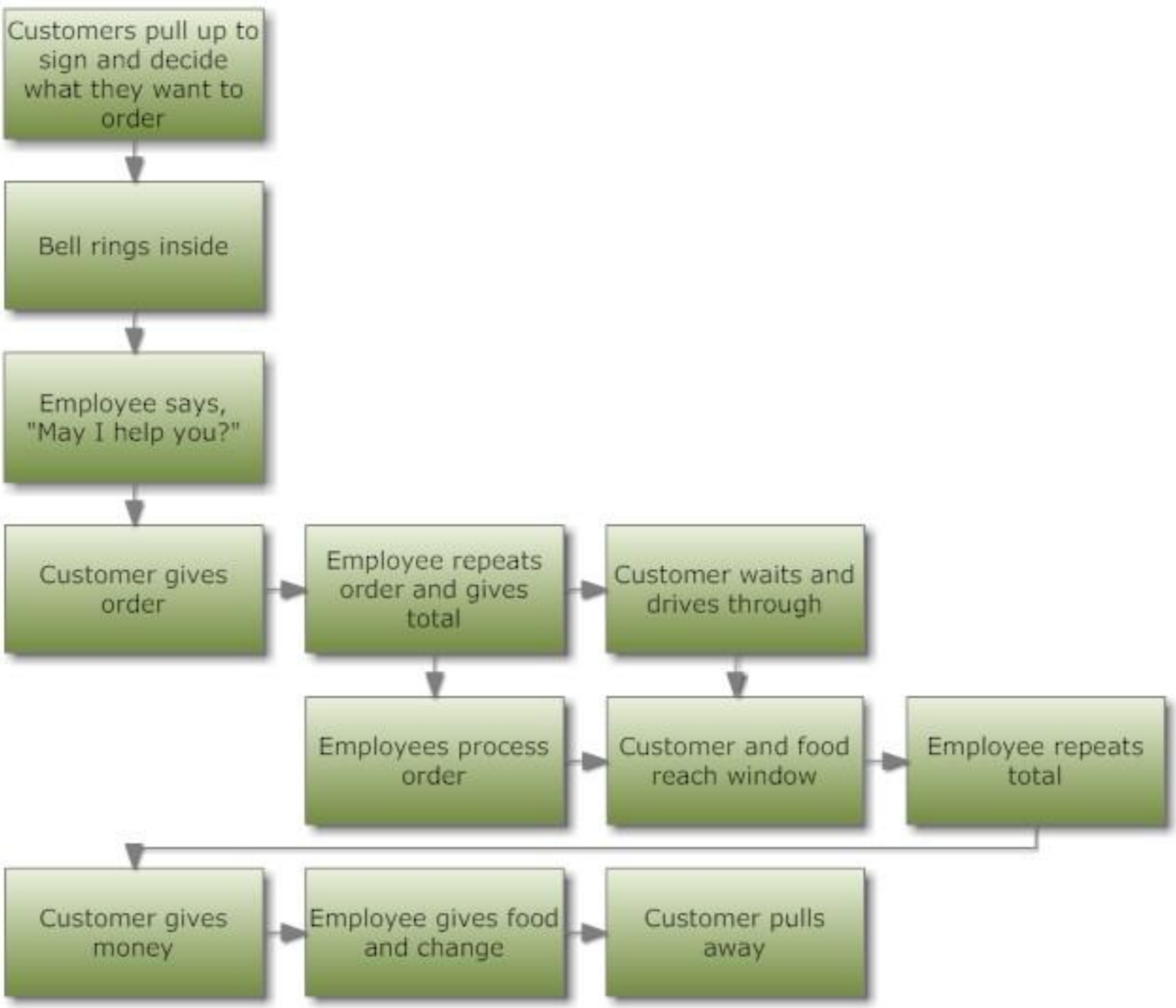
Wednesday, April 20, 2011

Chapter 13

Problems

2. A flow chart for a fast-food drive-through window is shown in figure 13.26. Determine the important quality characteristics inherent in this process and suggest possible improvements.

Figure 13.26 Flow Chart for a Fast-Food Drive-Through Window (Problem 2)

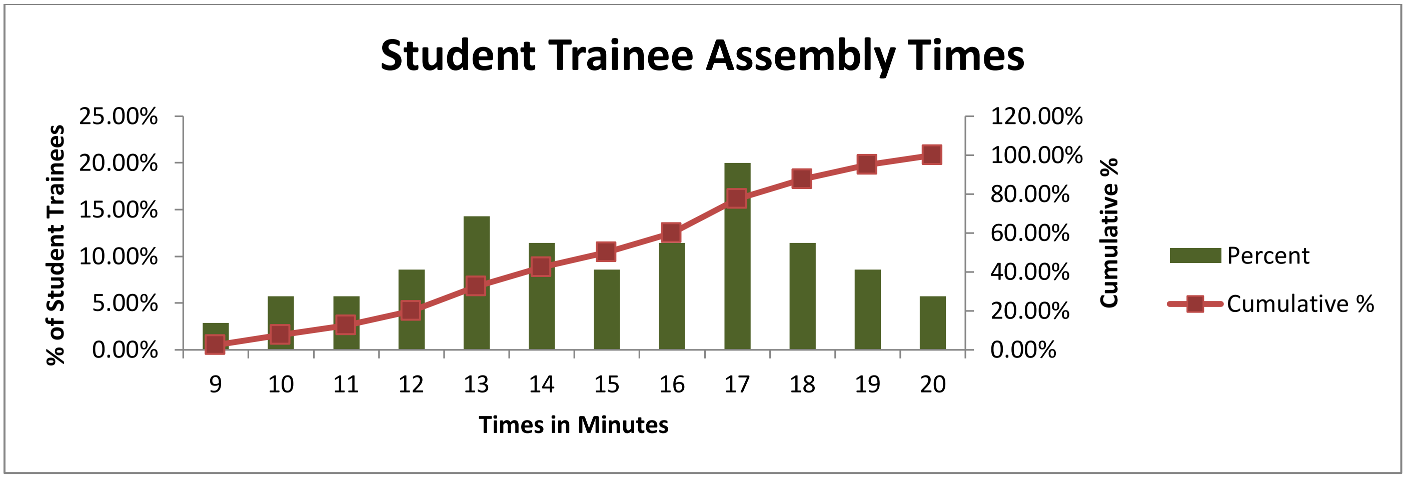


The important quality characteristics inherent in this process are the equipment such as the speaker system, bell, menu sign, cash register, and all cooking equipment inside used to prepare food orders. All these pieces of equipment must be kept in proper working condition so that all orders are processed correctly. The employees are also an important characteristic of this process. They should be courteous, friendly, accurate, and knowledgeable in their particular job areas and be trained accordingly. The menu sign must be kept current and changed throughout the day for the different menu times such as breakfast and dinner. For example, McDonald's has a breakfast menu that is in affect from the time they open in the morning until about 10:30 or 11:00 AM, at which time the menu should be changed to what is listed for dinner selections. The speaker system especially must be in working condition so that transmission between customer and employee is clear and understandable. Possible improvements to the system would be the use of a second window, which most fast-food restaurants have, but rarely use. The employee at the first window would be the one who takes the order and then the payment from the customer, while the employee at the second window would be the one who hands the customer their order. Adding an automated ordering system, such as those you see at places like Sheets, would be a good thing as well, but could also result in less available jobs. I know this could be a good addition for the restaurant, but I am always considerate of the job economy. If there is an automated system for taking drive-through orders, then that would take over the job of the actual person who would normally be taking the orders. Being a technology major, I see how good technology can be for things, but also take into consideration how it can be harmful. That may be a little off track, but I felt I had to state my thoughts.

5. The times required for trainees in an electronics course to assemble a component used in a computer were measured. These are shown in the C13Data.xls file for Prob. 13-5 on the student CD-ROM. Construct a histogram to graphically show the data. What recommendations for improvement would you give the course instructor, based on your findings?

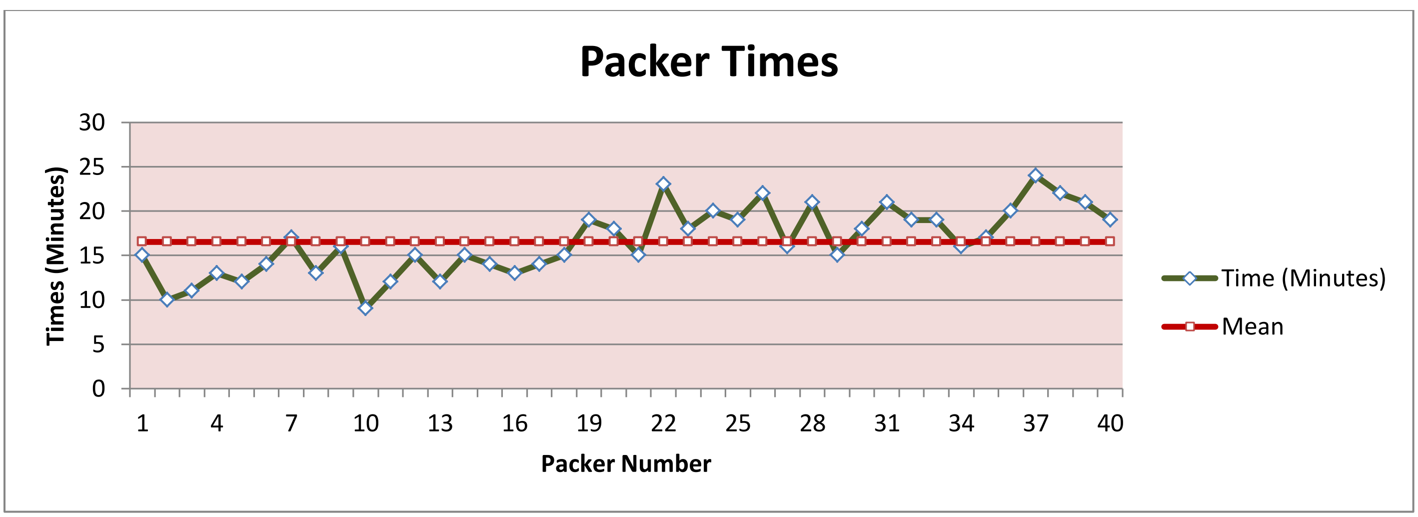
The following histogram and Pareto chart was created after placing the original data from each student number column and each time column into one column each, creating two columns of data for each instead of four. The bin ranges for the histogram were determined based on each time interval while the percent and cumulative percent were calculated accordingly. Based on the data, the average time it takes to assemble the computer component is 15.125 minutes; however, more than 50 percent of the students in this course are slower. The histogram shows a bi-modal distribution because the assembly time is determined by two groups, one being faster at 9 to 15 minutes and the other being slow at 16 to 20 minutes. As long as the conditions of assembly quality are the same for both groups, the instructor could find the root causes of slowness in the one group by comparing the techniques of both groups. The Excel Worksheet for the following histogram and Pareto chart is attached and includes all those for the following questions as well.

Times	*Percent*	*Cumulative %*	*Frequency*
9	2.86%	2.50%	1
10	5.71%	7.50%	2
11	5.71%	12.50%	2
12	8.57%	20.00%	3
13	14.29%	32.50%	5
14	11.43%	42.50%	4
15	8.57%	50.00%	3
16	11.43%	60.00%	4
17	20.00%	77.50%	7
18	11.43%	87.50%	4
19	8.57%	95.00%	3
20	5.71%	100.00%	2
			40



8. The times required to prepare standard-size packages for shipping were measured. These data are shown in the [C13Data.xls]() file for Prob. 13-8 on the student CD-ROM. Construct a scatter diagram for these data. What recommendations for improvement would you give the section leader, based on your findings?

The following scatter diagram shows that the first group of 20 packers has an average packing time of 13.85 minutes, making them faster at packing than the second group of 20 packers who have an average packing time of 19.25 minutes. It takes the second group an average of 5.4 minutes longer to prepare a standard-size package for shipping. The average for all workers combined is 16.55 minutes, which suggests that those in the first group are considerably faster at performing the process. If working conditions are the same for both groups, then the section leader should try to find the root cause of why the members of the second group are so slow. This can be accomplished by observing the methods of both groups, as well as testing to see if there are any significant differences in abilities between the group members. If the methods used by the first group can be taught to the slower group members, this could increase productivity, reduce cost, and perhaps even improve quality, simultaneously.



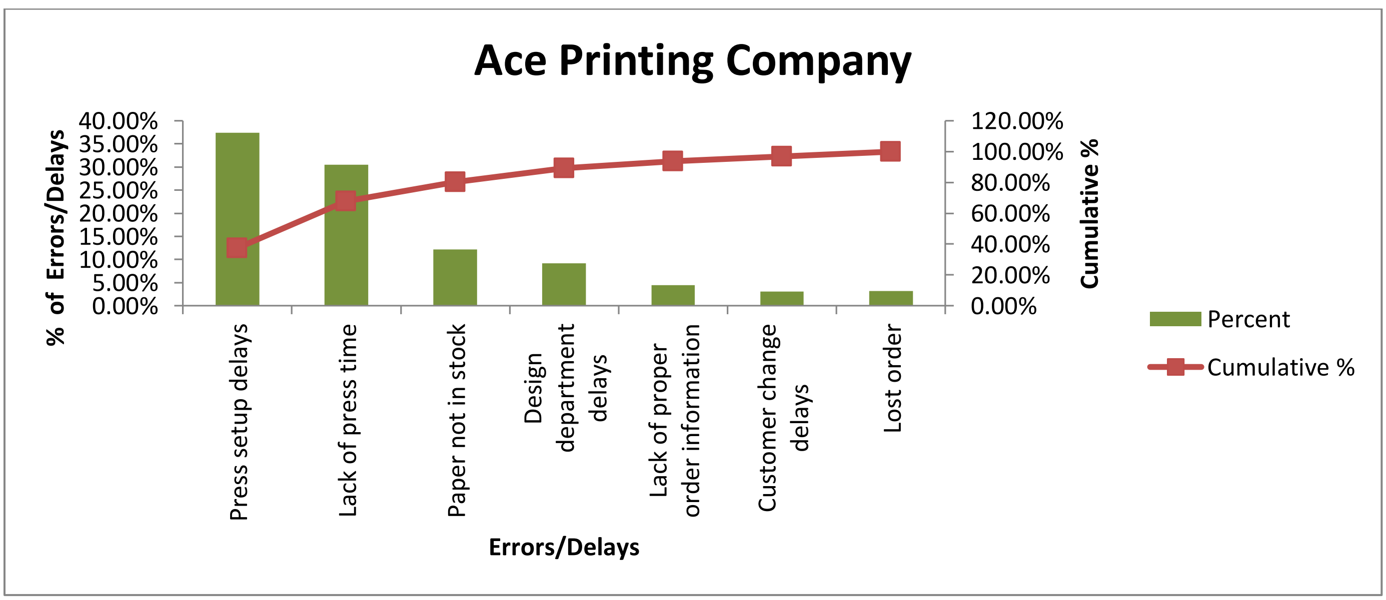
10. Ace Printing Company realized that they were losing customers and orders due to various delays and errors. In order to get to the root cause of the problem, they decided to track problems that might be contributing to customer dissatisfaction. The following list of the problems found shows their frequencies of occurrence over a six-month period. What technique might you use to graphically show the causes of customer dissatisfaction? What recommendations could you make to reduce errors and increase customer satisfaction?

Error/Delay Cause	Frequency
Customer change delays	20

Lack of press time	200
Design department delays	60
Paper not in stock	80
Lack of proper order information	29
Lost order	21
Press setup delays	245

The best way to graphically show the causes of customer dissatisfaction would be to construct a histogram and Pareto chart like those shown below. The first two causes have the highest percentage of errors totaling almost 68 percent. I would think that the lack of press time could be the cause of the press setup delays. These two areas need improved first and foremost. To start, allowing more press time for setting up the press should help reduce delays in the press setup since those setting up the press are given more time to do so. Hope that made sense!

Ace Printing Company Errors & Percentages			
Error/Delay Cause	**Percent**	**Cumulative %**	**Frequency**
Press setup delays	37.40%	37.40%	245
Lack of press time	30.53%	67.94%	200
Paper not in stock	12.21%	80.15%	80
Design department delays	9.16%	89.31%	60
Lack of proper order information	4.43%	93.74%	29
Customer change delays	3.05%	96.79%	20
Lost order	3.21%	100.00%	21
Total			**655**

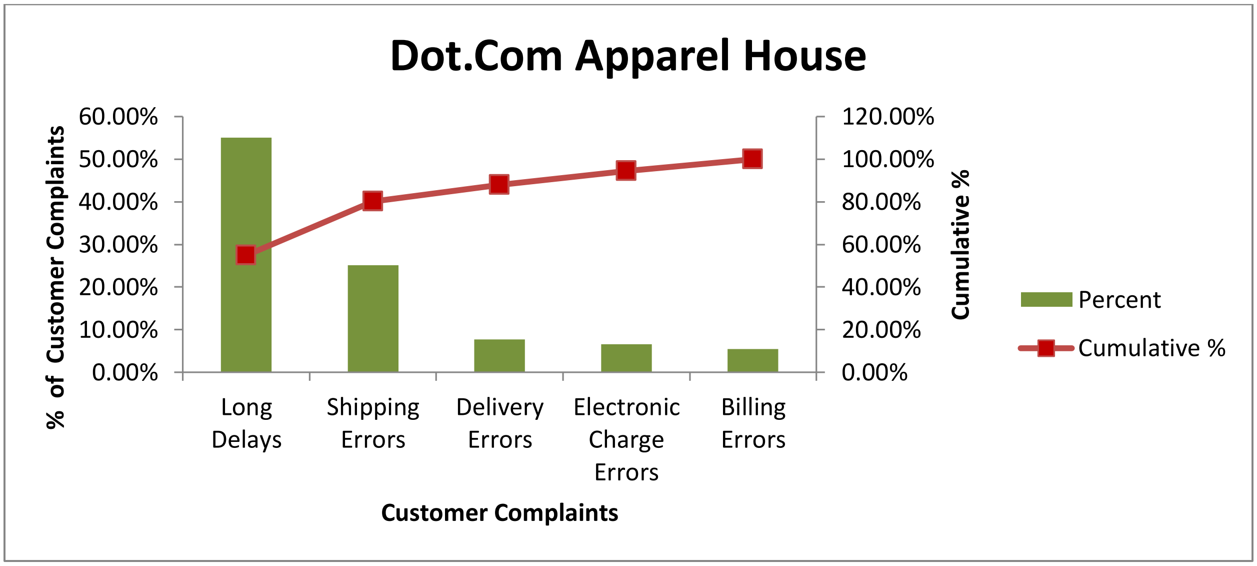


14. Analysis of customer complaints at DOT.COM apparel house revealed the following:

Billing errors	**537**
Shipping errors	**2,460**
Electronic charge errors	**650**
Long delay	**5,372**
Delivery error	**752**

Construct a Pareto diagram for these data. What conclusions can you reach?

Based on the following Pareto diagram, it is obvious that the two top problems are long delays totaling almost 55 percent of customer dissatisfaction and shipping errors which total almost 25 percent. These two problems together total over 80 percent of customer dissatisfaction. Therefore, it is obvious that these two problems should be targeted for improvements first and foremost.



15. The number of defects found in 25 samples of 100 Gamma Candy Company lemon drops taken on a daily basis from a production line over a five-week period is given here (by rows). Plot these data on a run chart, computing the average value (center line), but ignoring the control limits. Do you suspect that any special causes are present? Why?

0	**4**	**5**	**6**	**2**	**4**	**1**	**0**	**2**	**7**
15	**13**	**3**	**7**	**8**	**4**	**5**	**76**		
3	**4**	**1**	**2**	**5**	**6**				

The following scatter diagram (run chart) shows that this process is pretty stable. It doesn't have any major variations except for the fact that sample 11 and sample 12 are very far from the average, meaning that a special cause was most likely present.