

MEMORANDUM

Date: 4/23/2007

Re: Driver Error Penalty Policy

To: Matt Ford

From: Steve Worster

Introduction

In regards to the recent suggestion of implementing a policy that will penalize drivers for mistakes, the possible control of errors has been analyzed. A control chart has been created to determine if it is possible to reduce or eliminate errors from the delivery process. The possible effect the policy could have on productivity has also been investigated.

Findings

Statistical Analysis. A statistical analysis shows that a range of zero to eight errors per driver should be considered normal under the current process. It would not be fair to punish every mistake when many may be beyond the driver's control. One driver's errors were found to be outside the expectable range.

Psychological Impact. Implementing the driver penalty policy will cause employees to be afraid of making a mistake. Experts in the field of Management Psychology believe that the elimination of fear will lead to higher productivity. Employees who fear penalization will become overly cautious slowing down the overall process. Because most drivers had at least one error, the loss in morale could be widespread.

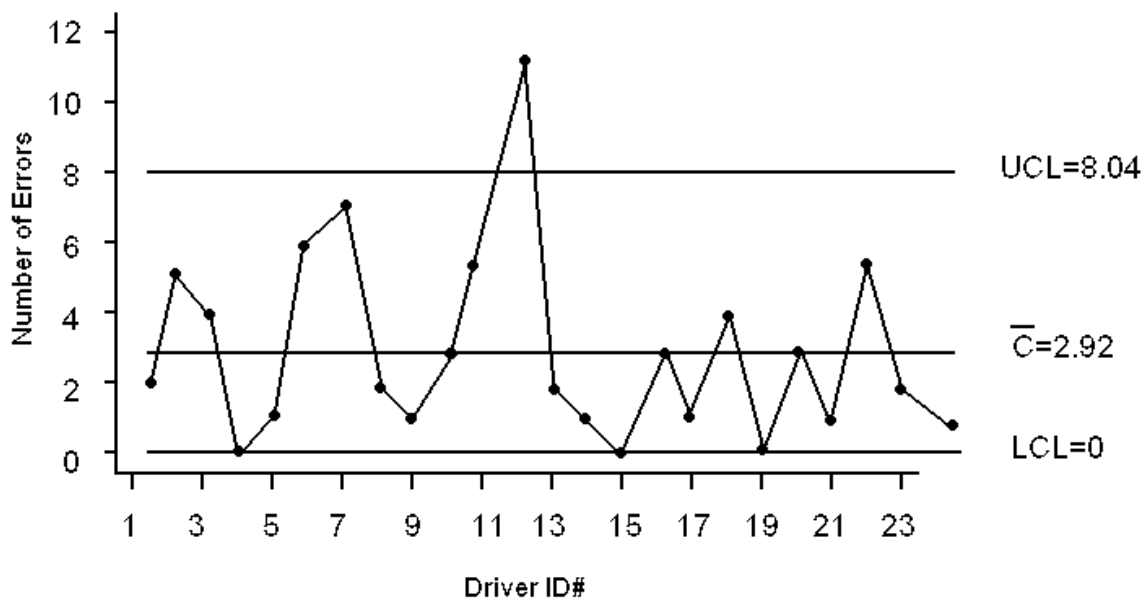
Review of Delivery Process. It is unlikely that all errors can be eliminated from the delivery process. The work process may need to be adapted to reduce errors by any significant margin. A review of the current process should be conducted to find if any built in errors can be identified and improved.

Discussion

Method. Statistical analysis of process variation was determined using Minitab15 Statistical Software. The software uses a mathematical system developed at Bell Labs in the 1920's that uses statistical models to determine if a process is experiencing normal or special variation. The system creates a range based on deviation from the average (\bar{c}). The upper control limit is found using the formula $UCL = \bar{c} + 3\sqrt{\bar{c}}$ and the lower limit using $LCL = \bar{c} - 3\sqrt{\bar{c}}$. Driver error data were provided by the director of Operations for Priority Dispatch, Inc.

Test Results. Results of the Statistical Process Analysis Test are shown in Figure 1-1. “All processes result in variation. **Chance** or **common cause variation** is caused by a number of randomly occurring events that are part of the production process and that in general can not be reduced without changing the process.”¹ A control chart has been created using Minitab15. The program plots a range that is considered to be “in Control” based on the data provided. If all of the points are randomly distributed between the points the system is “in control”. The results of the test on the driver errors indicate that driver number twelve has three special case errors. The process is out of control.

Figure 1-1: Control Chart for Driver Errors



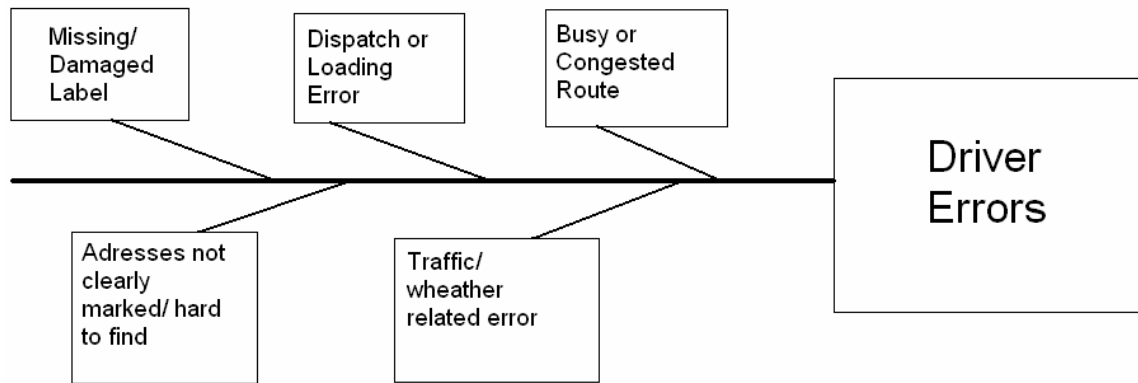
Managerial Psychology. Renowned statistician, author, and industrial consultant W. Edward Deming developed a Management system based around “continuous improvement”. He teaches that the understanding of variation and the psychology of workers are two key elements. The two are correlated in that if workers fear they will be punished for errors that they can’t prevent, then they will waste time trying to prevent them anyway. They will lose morale if they are punished unfairly.² The data provided shows that most of the errors were beyond the employees’ control. Punishing drivers for things they can not control is unfair. A majority of drivers had one or more errors. Penalizing drivers would cause widespread loss of morale, and may even create resentment towards drivers that have no errors.

¹ Keller & Warrack. 2003. *Statistics for Management and Economics*, 6th ed. Pacific Grove, Ca.: Thompson Learning, Inc. 756

² The Deming System of Profound Knowledge, The Deming Institute
<http://www.deming.org/theman/teachings.html> Feb. 4, 2007

Review of Delivery Process. Many factors exist that are beyond the control of management and drivers. Many common errors may occur because of flaws within the process itself. For example the packing labels could be mislabeled by the customer, the labels could be damaged or fall off in transit, or the receiving residence may not have the address clearly marked on the premises. It is recommended that a review of the process be conducted to identify and correct any systematic problems that may be occurring. It may be necessary to institute a systematic quality control process with aggressive error reducing goals such as six sigma. It is not recommended at this time to institute a policy that penalizes drivers for errors. Drivers and customers should be surveyed to help identify any known causes of common variation. Figure 2-1 illustrates an example fishbone diagram of some possible causes of errors. The drivers may be able to elaborate on these ideas. Since the drivers are out in the field every day they may have ideas about what causes errors.

Figure 2-1: Fishbone Diagram of Possible Causes of Driver Errors.



Driver number twelve is outside the control limits, however penalization is not recommended based on this data alone.

Limitations. Data provided is for one month only and therefore may not be indicative of actual results over a longer period. Provided data included only number of errors per driver and not the total amount of deliveries per driver or any other relevant data.