# Economic Design of Control Chart Using Taguchi Loss Functions

E-mail: 9315381@ mail.dyu.edu.tw

## ABSTRACT

An control chart is one of the most popular tools in statistical process control in industry. Usually, a conventional control chart is to use a sample of size 4 or 5, three sigma control limits from the process mean and the sampling interval depends on the different event by the quality engineer. This kind of control chart is very convenient for management, but it ignores the cost consideration. Duncan considered the cost of control chart and re-designed the control chart from the economic view-point in 1956. From then on, there are many researchers who are continually investigating the control chart design from cost consideration. The main purpose of this study is to construct an control chart for discontinuous production process under the consideration of Taguchi Loss Functions. The Orthogonal array is employed for related factors permutation and ANOVA for finding out the noticeable loss-cost factors in the model analysis. The sensitivity analysis is also used for understanding how the significant impact to the cost for different parameters. A numerical example is shown that the social loss is the most important in term of the cost of control chart and the sensitivity analysis shows that the increasing cost when the process is out of control, specification limit, the difference between the target and have a more significant effect on the loss cost, meaning that one should more carefully treat these parameter values when conducting an economic analysis.

Keywords : control chart ; economic design ; discontinuous process ; loss function

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