

## New process capability index using Taguchi loss functions

### ABSTRACT

Classic process capability indices such as  $C_a$ ,  $C_p$  and  $C_{pk}$  are well-known process capability indices, which are using widely. Since, process capability indices predict the capability of a process, they must have a significant relation with rate of rejects and losses. Studies showed that mostly process capability indices do not have a significant relation with rate of rejects or losses. Therefore, the loss-based indices are more appropriate and suitable indices to predict the capability of a process. In order to define a new loss-based process capability index, Taguchi loss functions were employed and this study proposed a novel process capability index called Taguchi-based Process Capability Index (TPCI). The methodology of this process capability index is based on standard rate of rejects for a capable process compared to other cases. Therefore, this study develops a new process capability index, which is Taguchi loss function-based and sensitive to losses. This new process capability index can provide a realistic and applicable metric to evaluate a process.

**Keyword:** Process capability index; Loss; Loss-based process capability index; Taguchi loss functions; Loss functions; Taguchi-based process capability index