Review report

The effects of large round-off errors on the performance of control charts for the mean when the quality characteristic is normally distributed with a known variance

The paper discusses the performance of the $\overline{X}$ chart that deviate unfavourably from what is expected when the data is rounded off. To evaluate the performance, authors calculates various performance metrics such as alpha, beta, ARL_0 and ARL_1. The study concludes that that standard control charts are inappropriate for crudely rounded data.

My specific comments are given below.

1. *References need to be updated. There are too many references more than a decade old. More recent references from the last five years may be included to improve the literature study.*
2. *I believe authors should avoid using the terminology used in the statistical inference such as null hypothesis (H_0) and alternative hypothesis (H_1). In the SPC context, in-control process and out-of-control process can be preferred.*
3. *The present study considers the case when the variance of normal distribution is known which makes this study very limited in actual practice. Authors should provide some examples of where the variance can be considered to be known.*
4. *It can be provided only one between the models (1) and (2).*
5. *It should be avoided using probability of Type I error. Instead false alarm rate is more appropriate in the SPC context. Similarly, probability of signal can be used in place of probability of 1-Type II error. On page 8, "alpha (α)- Type I error-the probability…." is confusing. α is not Type I error. It is the probability of Type I error (or false alarm rate). Same for beta (β).*
6. *Authors frequently use "the process is under control", for example, on page 8, under the definition of ARL_0. It should be "the process is in-control".*
7. *In this study, the sample size n (sub-group size) is considered mostly large, for example, $n = 15, 25$, 30, 40. Is there any specific reason to consider a large n? For the Shewhart chart when the quality characteristic follows a normal distribution, $n = 4, 5$, 7 is usually considered.*

8. *Authors considered both metrics* α *and* ARL_0*. However, for Shewhart chart,* $ARL_0 = \frac{1}{\alpha}$ *. Therefore, interpretations based on both metrics do not matter. Same is true for* ARL_1 *and* β *because* $ARL_1 = \frac{1}{1-\beta}$*. I would suggest to use only one between* α *and* ARL_0 *, and* ARL_1 *and* β*.*
9. *On several places, authors claim that the* α *increases implying that the chart's performance diminishes. It is true. But when the out-of-control performance is evaluated, it is said that for some case, the beta values of rounded data are smaller, therefore, the performance improves. However, it is not clear, whether* α *values for those case increase or decrease.*