# Acceptance sampling plans for high quality processes

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Lot-by-Lot acceptance sampling plans provide the practitioner with decision rules for acceptance or rejection of a current delivery. Acceptance sampling plans can be classified into variable plans when features from the lot are measured on numerical scale and attributive plans when features are measured that classify items as defective or non-defective.

We will treat the case where sampling takes place from lots that are coming from a supplier's process which is of high quality, i.e. a proportion defects near zero is associated to the process. Traditional sampling plans won't work in this case since any sample of reasonable size will probably contain zero defects.

We will propose a generalization of the modified chain sampling plans proposed in [1] that is applicable for as well attributive as variable inspection. For this purpose, it is assumed that lots are drawn from a continuing stream of lots of a process with an unknown but constant fraction defects. Chain sampling plans are able to accumulate information from samples drawn from historical lots to estimate the suppliers quality. The proposed plans allow to go further into history than the standard chain sampling plans of Dodge [2]. In contrast to zero acceptance number single sampling plans, this enables the design of steep operating characteristic (OC) -curves that possess an inflection point near zero.

Algorithms will be proposed to design the proposed plans when the OC-curve have to pass through two predetermined points that define producer’s and consumer’s risk. Experiments will show that for small fraction defects the required sample size is smaller compared to the classical chain sampling plans of Dodge.

References

[1] K. Govindaraju and C. Lai, A modified ChSP-1 chain sampling plan, MChSP-1, with very small sample sizes, American Journal of Mathematical and Management Sciences 18 (1998), pp. 343–358.
[2] H. Dodge, Chain sampling inspection plan, Industrial Quality Control 11 (1955), pp. 10–13.