Control Chart for Process Mean Monitoring Combining Variable and Attribute Inspections *

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Abstract

In this paper, we propose a new control chart, denoted by XkA, to evaluate the stability of a process mean. This chart is based on attribute (go/no-go gages) and variable inspections (physical measurements obtained using an instrument, such as a caliper) of the quality characteristic of interest from samples collected in equally spaced times. The control process starts with a sample evaluated by variable inspection, followed by k samples evaluated by attribute inspection, returning to this loop if the control chart does not detect any shift in the process mean. The traditional $\bar{X}$ control chart is used to evaluate the process mean by variables, and the evaluation by attributes is based on a go/no-go gage device, denoted by np_x. The results show that the new XkA chart presents a lower average cost than the approaches that use only variable or attribute inspections, adopting similar average run length values and the usual costs for attribute and variable inspections. Finally, we present an numerical application to show the applicability of the proposed control chart.

Keywords: Quality control; stochastic processes; Markov chain; minimize expected cost; attribute and variable control charts; average run length.

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