The utilization of Z and W charts for controlling service processes

José Gomes Requeijo
UNIDEMI, Departamento de Engenharia Mecânica e Industrial, Faculdade de Ciências e Tecnologia, FCT, Universidade Nova de Lisboa, 2829-516 Caparica, Portugal

Rogério Puga-Leal (rpl@fct.unl.pt)
UNIDEMI, Departamento de Engenharia Mecânica e Industrial, Faculdade de Ciências e Tecnologia, FCT, Universidade Nova de Lisboa, 2829-516 Caparica, Portugal

Ana Sofia Matos
UNIDEMI, Departamento de Engenharia Mecânica e Industrial, Faculdade de Ciências e Tecnologia, FCT, Universidade Nova de Lisboa, 2829-516 Caparica, Portugal

Abstract

A lag still exists between SPC applications in services and in manufacturing. The causes for such a discrepancy are discussed, and an approach for integrating customer demands and technical aspects of a service as well as to define which characteristics to measure and monitor, is presented.

Services are very often characterized by a large number of characteristics, with relatively few observations. The current piece of research addresses a methodology based on Z and W charts, which is proposed for monitoring service features, when there are many characteristics to study. An example associated to service provision is presented to illustrate the computation of Z and W as well as its interpretation.

Purpose

This piece of research presents the utilization of non-traditional control charts, notably *Z* and *W* charts, in services frameworks.

Design/Methodology/Approach

The shortcomings of traditional control charts are exhibited when compared to *Z* and *W* control charts. An example illustrates how to utilize these charts, their ability to monitor several characteristics simultaneously, along with a continuous monitoring of process capability.

Findings

The proposed approach allowed the representation of several process characteristics in the same charts. Furthermore, the characteristics don't have to be collected with the same periodicity, which enhances the approaches' flexibility. The *Z* and *W* charts are dimensionless and can be applied whenever it is possible to estimate process parameters. Therefore, they proved to be an interesting approach to be utilized in phase

2 of SPC. As a major shortcoming, one notices the difficulty for identifying the existence of non-random patterns.

Originality/Value
The work was focused on the utilization of Z/W charts for controlling small productions in situations that allow process parameters' computation. The approach was based on the utilization of Z/W for samples, but can be extended to individual observations or even to the control of discrete variables. Furthermore, a methodology for capability analysis in real-time is also proposed.

Keywords: Service industry, SPC, Z charts, W charts