A Non-Linear Statistical Process Monitoring Strategy-A Case Study of a Steel Making Shop

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Abstract

Process monitoring strategies are an amalgamation of procedures and techniques for monitoring of the manufacturing process for the eventual goal of production of good quality end product. The study delves into the development of a monitoring strategy based on statistical techniques and taking into account the nonlinearity of the data. The case study involving a Steel making Shop has been chosen to showcase the methodology thus developed. The statistical monitoring strategy devised is based on multivariate Hotelling T^2 chart and the nonlinearity of the data is addressed via the employment of Neural Network Filling model. The data consisting of the quality characteristics observations of the steel billets is fed to Neural Network Model for removal of nonlinear pattern. Thereafter the complete or partial linear transformed observations are being tested for the presence of fault(s) by employment of Hotelling T^2 Control Chart and upon the detection of fault represented by out-of-control observation appropriate actions ought to be initiated.

Key words: *Statistical Process Monitoring Strategy, Steel Making Shop, Hotelling T^2 Chart, Neural Network Fitting Model, Quality Characteristics, Out-of-Control Observations*

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