

ABSTRACT

Economic control charts for monitoring the quality of manufactured product in a single stage production system have received extensive treatment in the literature. In reality products are manufactured in multistage production systems (MPS). In multistage production systems the selection of number of control charts required and their location in the MPS and the working parameters for the selected charts is defined as Multistage Process Control policy (MPC policy). Multistage design problem is to select the optimal MPC policy. Thus single stage design models differ from the design requirement of multistage production systems.

In this work, the multistage design problem is formulated as an "Acyclic network" to explore all the possible configurations in the MPS. The optimal MPC policy is selected using the Dynamic programming approach. Nine numerical examples of six stage production system are presented to demonstrate the developed design procedure. Further, sensitivity analysis is carried out to identify the critical data parameters which affect the optimal MPC policy adversely when they are not estimated accurately.

The existing economic solution procedures for single stage np-chart are not meeting the demands of the current production systems. Even small changes in the process mean

fraction defective need to be detected and corrected. In this work, a new solution procedure is developed which quickly gives working parameters very close to the optimal parameters. The new procedure takes care of the limitations in the existing procedure.

The economic control charts may require several revisions due to process improvements or changes in the cost parameters and hence there is a need for quick design procedures. The single stage and multistage procedures developed are useful for quick designs at shop floor also.