Optimal Ordering Policy with Backordering for Products of Imperfect Quality

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In this paper, an economic order quantity (EOQ) model is developed for the situation where products received are not of perfect quality and complete backordering is assumed for any shortages. Whenever a new lot arrives, backorders are fulfilled first without inspection, and therefore any items of poor-quality released to fulfill backorders will result in added warranty cost. The remaining items are then inspected at a certain screening rate and items of poor-quality are sold as a single batch at a discounted price. A mathematical model is developed to determine an optimal ordering policy such that the total profit per unit time is maximized. A closed-form solution of the optimal policy is derived and some sensitivity analyses are carried out to study the effects of the cost parameters on the optimal policy. Finally, a numerical example is given to evaluate the performance of the optimal policy.