# Imperfect Production Inventory Model with Inspection Errors and Fuzzy Demand and Deterioration Rates

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**Abstract :** Our work presents an inventory model which illustrates imperfect production and imperfect inspection processes for deteriorating items. A cost-minimizing model is studied considering two types of inspection errors, namely, Type I error of falsely screening out a proportion of non-defects, thereby passing them on for rework and Type II error of falsely not screening out a proportion of defects, thus selling those to customers which incurs a penalty cost. The screened items are reworked; however, no returns are entertained due to deteriorating nature of the items. In more practical situations, certain parameters such as the demand rate and the deterioration rate of inventory cannot be accurately determined, and therefore, they are assumed to be triangular fuzzy numbers in our model. We calculate the optimal lot size that must be produced in order to minimize the total inventory cost for both the crisp and the fuzzy models. A numerical example is also considered to exemplify the procedure which is followed by the analysis of sensitivity of various parameters on the decision variable and the objective function.

**Keywords :** deteriorating items, EPQ, imperfect quality, rework, type I and type II inspection errors
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