An Extended EPQ Model with Imperfect Quality and Backorder

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ABSTRACT
This research investigated an extended economic production quantity (EPQ) model with imperfect quality and backorder. The classic EPQ model assumes that manufacturing facility functions perfectly during a production run. However, due to process deterioration or other factors, the production process may shift and produce imperfect quality items. In this study, we study two cases: one is quality screening conducted during production, the other is the screening process starts once normal production stops. Not all of the defective items are reworkable, a portion of them are scrap and discarded. Furthermore, not all of the defective items are perfect quality items after rework. The reworked items are classified into the restored perfectly items and the secondary product items. This research evaluated the effects of defective rate and reworkable portion ratio on the expected annual cost, optimal production lot size and the maximal level of backorder.

Keywords: imperfect quality, EPQ, scrap item, reworking.