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# Determining Replenishment Lot Size and Shipment Policy in an EPQ Model with Quality Assurance: An Alternative Approach and Analysis

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**Abstract**

This paper analyzes several studies that address the replenishment lot size and multi-delivery policy in an extended EPQ model with quality assurance. For a model in which the objective function is expressed in terms of lot size and number of shipments, previous studies have derived closed-form expressions for determining the optimal continuous values for both decision variables, using the classical optimization technique or algebraic method. In this paper, our aim is to show how to apply other optimization methods to derive explicit closed-form expressions, not only for the optimal lot size, but also for the optimal integer number of shipments and the minimum total cost of the model. Furthermore, we provide a helpful supplement to those related studies, specifically, a threshold for implementing multi-delivery policy and the effects of problem parameters on the lot size decision and shipment policy.

*Keywords:* Inventory, EPQ, multiple shipments, derivatives-free optimization, imperfect quality.