## Solving finite production rate model with scrap and multiple deliveries

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## Abstract

This paper examines finite production rate (FPR) model with scrap and multiple deliveries. Classic FPR model assumes continuous issuing policy for satisfying demand and perfect quality production for all items produced. However, in real life vendor-buyer integrated system, multiple shipment policy is practically used and generation of defective items during a production run is inevitable. Mathematical modeling and analysis is used, renewal reward theorem is employed to cope with the variable production cycle length, and the integrated long-run average cost per unit time is derived. A closed-form optimal batch size solution to the problem is obtained. A numerical example demonstrates its practical usage.

Keywords: FPR model, production, optimal lot size, scrap, multiple deliveries

## 1. Introduction

The aim of this paper is to determine optimal lot size for finite production rate (FPR) model with random scrap rate and multiple shipments of the perfect quality items. In the manufacturing sector, when products are produced in-house instead of being acquired from outside suppliers,

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