

Deteriorating item inventory model with shortage due to supplier in an
integrated supply chain

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Abstract

This study develops an inventory model for deteriorating items in an integrated supply chain formed by three partners: a producer, a distributor and a retailer. They have different delivery frequencies; the ratio of lot delivery between the producer and the distributor is 1 to 1, and the ratio of lot delivery between the distributor and the retailer is 1 to many. A mathematical model with these three partners is derived for an optimal lot size and the number of deliveries. The purpose of this study is to minimize the joint total cost of the producer, distributor and retailer. A numerical example can be shown that the integrated policy results in an impressive cost-reduction compared with any an independent decision. Finally, a sensitivity analysis is performed to illustrate how deterioration rates affect the optimal solution.

Keyword : Deteriorating inventory model; Supply chain; Joint total cost; Integrated policy.