

A Backlogged EOQ Model with Time-Varying Deterioration, Holding Cost and Generalized Demand

Rojalin Behera, Trailokyanath Singh* and Pallavi Joshi

*Department of Mathematics, C. V. Raman Global University
Odisha, India*

Sudhansu Sekhar Routray

*Department of Mathematics, Odisha University of Technology and Research
Odisha, India*

Abstract: This paper deals with the EOQ of single-type item inventory model under shortages. The deterioration rate, demand pattern and holding cost are considered as a two-parameter Weibull density function, a quadratic and a linear function of time, respectively. Shortages in this study are allowed and are partially backlogged. A solution procedure is introduced to determine the two decision variables such as shortages period and cycle length and also to compute optimal system cost and order quantity. The optimal solutions of the proposed model not only exist but also are unique. The theoretical results are verified numerically with a couple of examples. At the end, sensitivity analysis of all parameters is carried out.

Keywords: Differential equation, EOQ, Quadratic demand, Shortages, Two-parameter Weibull distribution deterioration

JEL Classification Number: C61, D24, E22, G31, M11

*Corresponding author. Email: trailokyanaths108@gmail.com