International Journal of Statistics and Management System, 2008, Vol. 3, No. 1–2, pp. 166–175.

On preventive replacement of a device under Poisson shocks with discrete phase type shock probabilities*

K. Aneesh Kumar† and M. Manoharan‡

Abstract

This paper proposes an optimal preventive replacement policy for a device that sustains shocks that arrive according to a homogenous Poisson process. The discrete phase type distribution (DPH) is assumed for the failure (shock) probabilities. The DPH approximation for the failure probabilities could help to handle quite general situations. The problem assumes greater significance when loss due to preventive replacement is smaller than that due to the corrective replacement. For discrete phase type failure probabilities, the long run cost per unit time for replacement is considered and the problem of finding the optimum value of the replacement time is discussed. A comparison of the above preventive replacement policy with the failure replacement is made proposing the gain due to age replacement.

Received: October 19, 2006; *Accepted:* December 9, 2007.

Key words and phrases: preventive replacement, Poisson shock model, phase type distribution.

AMS 2000 subject classifications. Primary 90B25; secondary 60K10, 62N05.

†*Mailing Address:* Department of Statistics, Mahatma Gandhi College, Iritty–Keezhur. P. O. ,Kannur–Kerala–670 703, India. *E–mail:* ane_k@rediffmail.com.

‡Department of Statistics, University of Calicut, Kerala–673635, India.