# An Inspection Model with Discount Factor for Products having Weibull Lifetime

## R. H. Yeh[1,*], H. D. Chen[1], and C.-H. Wang[2]

[1]Department of Industrial Management, National Taiwan University of Science and Technology No.43, Keelung Rd., Sec. 4, Taipei, Taiwan

[2]Department of Industrial Engineering and Management, I-Shou University, 1Section 1, Syuecheng Rd., Dashu Township, Kaohsiung County, Taiwan

**Abstract**⎯This paper investigates the case where a failed product can be detected only through inspections. During the lifetime of the product, it is inspected once and then must be replaced by either corrective or preventive replacement depending on the result of the inspection. By incorporating a discount factor, a mathematical model is established to take the time value of costs into account. Based on the model, the optimal time epoch for inspection is derived such that the present value of the expected total cost is minimized. Since there is no closed-form solution of the optimal time epoch for inspection, some properties are investigated and an efficient algorithm is provided to search for the optimal policy. Finally, numerical examples for products having Weibull lifetime distributions are given to investigate the effects of the continuous discount rate and cost parameters on the optimal policy and the corresponding present value of the expected total cost.

***Keywords***⎯Inspection policy, Discount factor, Replacement, Present value

* Corresponding author's email: rhyeh@mail.ntust.edu.tw