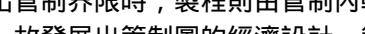


考慮預防保養之X管制圖經濟：統計設計之研究

陳宗昱、余豐榮

E-mail: 9806335@mail.dyu.edu.tw

摘要

隨著科技的進步，自動化生產設備已逐漸取代人力生產，因而在製造的過程中，對自動化生產設備加以保養，減少製程發生變異，可有效提升產品品質並降低生產成本。傳統的管制圖運用抽樣的統計特徵值來繪製管制圖，圖中包含中心線與管制界限，當製程發生非機遇原因使平均值超出管制界限時，製程則由管制內轉變為管制外，透過管制圖的監控可及早發現異常。由於傳統的管制圖未考慮到經濟層面，故發展出管制圖的經濟設計。管制圖的經濟設計雖然可以得到較低的成本，但在型I誤差和檢定力的統計特性方面表現並不好，故將兩者結合以彌補彼此的不足。然而，一般管制圖設計也未考慮到機器設備之預防保養，故本研究以管制圖之經濟設計為基礎，在考慮機器設備之預防保養情形下，加入統計條件限制，以建立管制圖設計分析模型，並找出管制圖經濟—統計設計參數值。

關鍵詞：管制圖、經濟—統計設計、預防保養

目錄

封面內頁

簽名頁

授權書 iii

摘要 V

ABSTRACT vi

致謝 vii

目錄 viii

圖目錄 x

表目錄 xi

第一章 緒論 1

1.1 研究背景與動機 1

1.2 研究目的 3

1.3 研究範圍與限制 4

1.4 研究步驟與方法 5

1.5 研究架構與流程 5

第二章 文獻探討 7

2.1 管制圖的經濟設計 7

2.2 管制圖的經濟—統計設計 9

2.3 預防保養 10

2.4 預防保養結合管制圖的經濟設計 11

第三章 考慮預防保養管制圖經濟—統計設計 13

3.1 符號定義 13

3.2 設計模式之假設條件 15

3.3 經濟—統計設計 16

3.4 管制圖之週期時間分析 17

3.5 管制圖之成本模式分析 22

3.6 探討製程平均單位成本模式 25

3.7 求解過程 25

第四章 應用範例 27

4.1 參數設計 27

4.2 統計參數敏感度分析 32

4.3 其他參數敏感度分析 34

第五章 結論與建議 42

5.1 結論 42

5.2 未?研究建議 43

參考文獻 44

參考文獻

- 中文部份:1. 蔡炫君 , 1998 , 考慮多重非機遇原因在預防保養策略下之管制圖經濟設計之研究 , 華梵大學工業管理研究所碩士論文。 2. 鍾佳樺 , 2003 , 考慮預防保養之變動樣本數與抽樣間隔管制圖經濟性設計 , 雲林科技大學工業工程與管理研究所碩士論文。 英文部分:3. Barlow, R. E. and Hunter, L. C., " Optimum preventive maintenance policies " , Operations Research, 8, 90-100. (1960)4. Ben-Daya, M. and Rahim, M. A., " Effect of maintenance on the economic design of control chart " , European Journal of Operational Research, 120, 131-143. (2000)5. Chiu, W. k. and Cheung, K. C., " An economic study of -charts with warning limits " , Journal of Quality Technology, 9, 166-171. (1977)6. Duncan, A. J., " The economic design of charts used to maintain current control of a process " , Journal of the American Statistical Association, 51, 228-242. (1956)7. Duncan, A. J., " The economic design of -charts when there is a multiplicity of assignable causes " , Journal of the American Statistical Association, 66, 107-121. (1971)8. Lorenzen, T. J. and Vance, L. C., " The economic design of control charts:a unified approach " , Technometrics, 28, 3-10. (1986)9. Lotka, A. J., " A contribution to the theory of self-renewing aggregates with special reference to industrial replacement " , Annals of Mathematical Statistics, 10, 1-25. (1939)10. McWilliams, T. P., " Economic control chart design and the in-control time distribution : a sensitivity analysis " , Journal of Quality Technology, 21, 103-110. (1989)11. McWilliams, T. P., " Economic, Statistical, and Economic-Statistical Chart Designs " . Journal of Quality Technology, 26, 227-238. (1994)12. Montgomery, D. C., " The economic design of control charts:a review and literature survey " , Journal of Qualit Technology, 12, 75-87. (1980)13. Montgomery, D. C., Torng, J.C.C., Cochran, J.K. and Lawrence, F.P., " Statistically constrained economic design of the EWMA control chart " , Journal of Quality Technology, 27, 250-256. (1995)14. Nagendra, Y. and Rai, G., " Optimum sample size and sampling interval for controlling the mean of non-normal variable " , Journal of American Statistical Association, 66, 637-640. (1971)15. Weiss, G., " On the theory of replacement of machinery with a random failure time " , Naval Research Logistics, 3, 279-293. (1956)16. Woodall, W. H., " Weaknesses of the economic design of control charts " , Technometrics, 28, 408-409. (1986)17. Rahim, M. A., " An investigation of economic design of charts to control non-normal process means " , Engineering Optimization, 3, 193-208. (1985)18. Saniga, E. M., " Joint economically optimal design of and R control charts " , Managements Science, 24, 420-431.(1977)19. Saniga, E. M., " Economic statistical of control-chart designs with an application to and R charts. Technometrics, 31, 313-320. (1989)20. Savage, I. R., " Cycling " , Naval Research Logistics, 3, 163-175 (1956).21. Zhang, G. and Berardi, V., " Economic statistical design of control charts for systems with Weibull in-control times " , Computers and Industrial Engineering, 32, 575-586.(1997)