SPC與EPC整合架構下管制圖之評估與選用

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摘 要

在透過製程管制提升產品品質之過程中，統計製程管制(Statistical Process Control，SPC)為其中一種常用之技巧。主要是採用管制圖來偵測製程參數（如：平均值）是否受到外來可歸屬原因的影響而變動。然而在某些生產環境下如：化學、石油等連續性製程產業或抽樣間距極為緊密的條件下，品質數據間之自我相關性程度，往往相當顯著。這使得傳統獨立性假設下發展出來的管制圖，使用效率大打折扣。 工程製程管制(Engineering Process Control，EPC)為另一類製程管制之手法。主要在於定期地透過調整製程之輸入變數，來補償輸出和目標值之差距。原本即應用於品質數據具相關性之製造環境中。近年來，逐漸被引入與SPC之技巧進行整合。一方面，除了提供製程面對自我相關性問題時新的解決管道；經由EPC允許隨時對製程進行調整的功能，也使得製程在進一步降低變異、提升整體管制效益方面，著實增加了新的貢獻。 但是，文獻中大抵強調整合SPC與EPC後所獲得之效果，對於整合時所衍生之議題，諸如：EPC控制對管制圖偵測上之影響、整合架構下管制圖偵測效益之比較等，則缺乏較為周延之研究。因此，本研究在採用EPC之辦法來解決自我相關性所帶來的困擾之餘，也針對上述議題，加以深入探討。經由模擬研究之結果顯示：EPC控制確實會對管制圖偵測某種情況之製程干擾造成影響，而運用累積分數和管制圖能大幅降低EPC之影響，不啻為整合架構下一種新的選擇。

關鍵詞 : 統計製程管制、工程製程管制、自我相關性、累積分數和管制圖

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