A Study of Design Parameter for Central Tire Inflation System (CTIS) Via Taguchi Method

施箴鋮、余豐榮

E-mail: 9509676@mail.dyu.edu.tw

ABSTRACT

The possibility of regional conflicts instead of comprehensive war forcing the nations (especially in Europe and America) adjust their orientation in national defense development in designing facilitating and light equipment ground weapon to meet the requirement of speedy deployment and military need. The armored wheel vehicle is refined due to this reformation. The Central Tire Inflation System (CTIS) is the subsystem of the armored wheel vehicle. The assembly of CTIS is not self research and development or made according to its measurements but procured from the spot market. To install the CTIS into different type of vehicles, the vehicle system designers need to integrate it into vehicle internal according to the dimension of the vehicle, the restriction of installation space, the path of routing, and make sure the system operates normally, even to achieve its optimum performance. To search the optimization of the CTIS parameter design under minimum time and reaching the inflation and deflation requirements, through Characteristics Factors Analysis, this study selected the types of connector, angles of air plug, diameters of steel pipe and flexible pipe as the four controlled factors. Through the Taguchi method and by exercising the analysis from experiments, the most appropriate CTIS configuration resulted. The results of confirmation experiment fall on the confidence interval. The reproducibility of experiment is well.

Keywords : Armored Wheel Vehicle, Central Tire Inflation System (CTIS), Taguchi Method, Confidence Intervals

Table of Contents

REFERENCES

1.工業技術研究院(民91)，中央胎壓系統(Central Tire Inflation System, CTIS)保修手冊，新竹。 2.工業技術研究院(民91)，中央胎壓系統(Central Tire Inflation System, CTIS)操作指引，新竹。 3.宋一之譯(民84)，美國兵力投射的先鋒—第18空降軍，國防譯粹，22卷6期，台北。 4.吳俊斌(民93)，薄膜成長及其特性研究，國立中山大學物理研究所碩士論文。 5.林秀雄(民82)，品質管理－品質管制、品質規劃、品質工程、品質經營，新知企業管理顧問有限公司，台北。 6.林柏翰(民91)，磨耗型產品壽命之評估及可靠度提升模型之研究，義守大學工業工程與管理研究所碩士論文。 7.范仁威(民91)，歐盟共同防衛政策與快速反應部隊之研究，南華大學歐洲研究所碩士論文。 8.張永豐(民92)，應用類神經網路處理伺服控制系統自動調整動作之研究－以CNC 工具機為例，朝陽科技大學工業工程與管理所碩士論文。 9.張季娜、羅仕勇、宋振昌、蔡彰文、陳世璉、莊泰旭、邱鎮宏、高述崙譯(民80)，田口式品質工程導論，中華民國品質管制學會，台北。 10.楊國雄(民91)，應用模糊控制理論與田口方法於汽電共生廠鍋爐自動燃燒控制之研究，國立成功大學電機工程學系碩士論文。 11.鍾清章、江瑞清、楊錦洲、林朝蒼、李友錚、葉政治、黃廷彬譯(民83)，品質工程 (田口方法) —Quality Engineering—，中華民國品質管制學會，台北。 12.蘇朝墩(民94)，品質工程，中華民國品質學會，台北。 13.小西省三(民80)，品質評價的SN比，田口品質工程組譯，中國生產力中心，台北。 14.吉澤正孝(民79)，開發、設計階段的品質工程，田口品質工程組譯，中國生產力中心，台北。 15.?山巽子(民80)，品質設計的實驗計畫法，田口品質工程組譯，中國生產力中心，台北。 16.Adams, B. T. (2002) Central Tire Inflation for Agricultural Vehicles, Doctor of Philosophy in Agricultural Engineering, College of the University of Illinois at Urbana-Champaign. 17.Robert, R. K. (1993) Operational Testing of Central Tire Inflation System Proves the Benefits of Low Tire Pressure in Logging Operations, Technical Paper, Document Number: 933056, Society of Automotive Engineers International. 18.Bounou, M.、S. Lefebvre and X. D. Do (1995) Improving the quality of an optimal power flow solution by Taguchi method, Electrical Power & Energy Systems, Canada, 17(2), 113-118. 19.Chen, Y. H.、S. C. Tam、W. L. Chen and H. Y. Zheng (1996) Application of Taguchi method in the optimization of Lasermicro-Engraving of Photomasks, International Journal of Materials & Product Technology, Singapore, 11(3-4), 333-344. 20.Cheng, C. C.、M. S. Young、C. L. Chuang and C. C. Chang (2003) Fabrication optimisation of carbon fiber electrode with Taguchi method, Biosensors and Bioelectronics, Taiwan, ROC, 18(7), 847-855. 21.CM Automotive Systems Group LLC, Central Tire Inflation System Operating Instructions, U.S.A. 22.CM Automotive Systems Group LLC, Central Tire Inflation System Maintenance Manual, U.S.A. 23.Ghani, J. A.、I. A. Choudhury and H. H. Hassan (2004) Application of Taguchi method in the optimization of end milling parameters, Journal of Materials Processing Technology, Malaysia, 145(1), 84-92. 24.Altunel,

A. O. and F. H. Cornelis (1998) The Effect of Lowered Tire Pressure on a Log Truck Driver Seat, Louisiana State University Agric. Center Baton Rouge, International Journal of Forest Engineering, U.S.A. 9(2), 65-70. 25.Lu, S. M.、 Y. M. Li and J. C. Tang (2003) Optimum design of natural-circulation solar-water-heater by the Taguchi method, Base de Sumaris, Energy-Oxford-, 28(7), 741-750. 26.Smith, D. M. (1993) Effects of variable tire pressure on road surfacings, Transportation Research Record, 12(21), 313-328.