Study of characteristic for novel motorcycle injector

侯孟良、張舜長

E-mail: 9707931@mail.dyu.edu.tw

ABSTRACT

DCP is composed of two major components: a fuel pump module and an injector. With a prescribed voltage waveform imposed on DCP, the inner solenoid valve is first activated to start the compression stage for expelling air bubble. After that, the valve is immediately closed to build up the high pressure inside DCP for forcing gasoline passing through the nozzle. In response to the shutdown of electrical power, DCP restores to its original rest state in the end of the ejection stage. The gasoline liquid jet with adequate inertia momentum would overcome the liquid surface tension and viscous force for accomplishing the droplet injection. The present study has successfully constructed the test and measurement platform to determine the baseline mass flowrate characteristics for a DCP device. To establish a useful database for the future development of the injection technology for motorcycles, this work is also extended to explore the variations of injection performance at different settings of environmental pressure, temperature, and voltage of battery. This Study sets up to control program by the LabVIEW, which can controls every experiment parameter control condition of DCP fuel injection, such as operative frequency of the fuel injection, the operative time of the fuel injection sprays, etc. It uses CCD to pick a fluent situation of the fuel injection that can observes the difference flows of key parameter of the voltage and vacuum pressure to DCP injection and traditional fuel injection. Keywords: Injector, Injection performance, Fuel pump, DCP, LabVIEW

Keywords : Injector, Injection performance, Fuel pump, DCP, LabVIEW

Table of Contents

REFERENCES

[1] http://www.motc.gov.tw/mocwebGIP/wSite/lp?ctNode=162&CtUnit=94&BaseDSD=16&mp=1。

[2] 陳永昌，“汽車引擎”，新科技圖書股份有限公司，1991。

[3] B. Chehroudi, K. M. Sinko, and S. Shih,“A Novel Approach for Simultaneous NOx and Smoke Reduction: Interaction-Sprays Injection,” SAE Paper NO.961678, 1996.

[4] S. D. Habchi, and A. J. Przekwas,“REFLEQS-2D: A Computer Program for Turbulent Flows with and without Chemical Reaction, Volume 1: User’s Manual,” GR-88-4, CFD Research Corporation, Huntsville, AL, 1989.

[5] M. L. Ratcliff, and C. E. Smith,“REFLEQS-2D : A Computer Program for Turbulent Flows with and without Chemical Reaction, Volume 2: Validation Manual,” GR-88-4, CFD Research Corporation, Huntsville, AL, 1989.

[6] H. C. Mongia, R. S. Reynolds, and R. Srinivasan,“Multidimensional Gas Turbine Combustion Modeling : Applications and Limitations,” ALAA Journal, Vol.24, pp.890-904, 1986.

[7] A. J. Ferrenberg, and M. S. Varma,“Atomization Data Requirement for Combustor Modeling,” NASA Report NAS8-34504, 1986.

[8] M. Schuman, and W. Webber,“Transient Performance Program,” AFRPL-TR-80-2, 1980.

[9] H. H. Chiu, “ Effects of Bipropellant Spray Injection and Atomization on Vaporization and Combustion Performance, ” Rocket Performance Panel of JANNAF, NASA George C, Marshall Space Flight Center, 1987.
[10] A. H. Lefebvre, “ Airblast Atomization, ” Prog. Energy Combustion Sci., Vol.6, pp.233-261, 1980.
[11] G. M. Feath, “ Current Status of Droplet and Liquid Combustion, ” Prog. Energy Combustion Sci., Vol.3, pp.191-224, 1977.
[12] K. A. Sallam, Z. Dai and G. M. Faeth, “ Liquid Breakup at the Surface of Turbulent Round Liquid Jets, ” International Journal of Multiphase Flow, Vol.28, pp.427-779, 2002.
[13] A. H. Sterling and C. A. Sleicher, “ The Instability of Capillary Jets, ” Journal of Fluid Mechanics, Vol.68, pp.477-495, 1975.
[14] R. D. Reitz and F. V. Bracco, “ Mechanism of Atomization of a Liquid Jet, ” Phys. Fluid, Vol.25, pp.1730-1742, 1982.
[15] S. P. Lin and D. J. Kang, “ Atomization of a Liquid Jet, ” Phys. Fluid, Vol.30, pp.2000-2006, 1987.
[16] A. J. Przekwas, S. G. Chuech and A. K. Singhal, “ Numerical Modeling for Primary Atomization of Liquid Jets, ” AIAA-89-0163, 1989.
[17] 林雍傑, “ 電子噴射機車引擎省油低污染及高性能動力特性之 ECU Map建立 ”, 國立雲林科技大學機械工程系碩士論文, 2004。
[18] 熊湘明, “ 四行程機車噴油系統參數研究 ”, 國立台北科技大 學車輛工程系碩士班, 2003。
[19] 翟立謙, “ 電控摩托車發動機噴油及點火控制MAP建模仿真與 實驗研究 ”, 湖南大學, 2006。
[20] V. K. Jones, J. D. Powell and G. F. Franklin, “ Adaptive Air-Fuel Ratio Control of a Spark-Ignition Engine, ” SAE940373, 1994.
[21] 張子文, “ 再生式剎車系統速度控制之分析及設計 ”, 大葉大 學自動化工程學系碩士論文, 2002。
[22] 李思賢, “ 數位式單相低功率太陽光電能轉換系統 ”, 國立中 山大學電機工程學系碩士論文, 2003。
[23] http://www.mikuni.co.jp/e/iBeat/index.html。
[24] 蔡朝洋, “ 電工實習(四) ”, 全華科技圖書股份有限公司, 1997。
[25] IGBT/Power MOSFET Gate Drive Photo – IC Couplers TLP250 (INV)/TLP250f (INV), TOSHIBA, 1999.
[26] 蘇卓盛, “ 應用於感應加熱的負載並聯共振電流型反流器設計 與研製 ”, 私立中原大學電機工程學系碩士論文, 2003。
[27] 葉佳諺, “ 機車噴射系統噴嘴設計對引擎性能提升暨排污減量 之研究 ”, 國立雲林科技大學機械工程系碩士論文, 2005。
[28] R. J. Moffat, “ Described the Uncertainties in Experimental Results, ” Experimental Thermal and Fluid Science, Vol.1, pp.3-17, 1988.