

行政院及所屬各機關出國報告

(出國類別:開會)

參加 2011 年車用燃料與引擎新技術 國際研討會

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摘 要

隨著化石能源日漸衰竭以及全球對溫室效應氣體減量之呼聲日益殷切，世界各國主要能源業者、油公司以及車輛業者無不盡全力設法因應。造成近幾年來在車輛及引擎設計、污染排放防制機制、車輛新能源之利用、以及節能技術(CO₂ 排放減量)等日新月異發展迅速。本次出國主要參加在日本京都由美國汽車工程師協會(SAE)與日本 JSAE 所舉辦之「2011 車用燃料與引擎新技術國際研討會」。

本項研討會內容共包含學術發表討論及車輛相關新技術展覽兩部份。論文發表部份涵蓋汽、柴油引擎燃燒模擬與理論探討、車用生質燃料特性及發展趨勢、車用潤滑油應用現況以及電動車輛相關技術發展等；展覽部份則主要包含新引擎技術展覽以及引擎燃燒及排氣分析儀器展覽兩部份。

綜合整理本研討會相關論文，歸納未來汽油引擎技術將會朝提高引擎壓縮比、採用渦輪增壓、稀薄燃燒、直接噴射供油以及 HCCI 供油等方式發展；柴油引擎未來則大致將會朝降低引擎壓縮比，讓 HC、CO 酌量提高，去換取 NO_x 的降低，以求符合未來嚴苛的污染排放法規。而因應未來車輛及引擎技術發展，汽油品質將需要具備高辛烷值、低硫份以及低芳香烴；而車用柴油則必須具備高十六烷值(可以有效縮短柴油引擎點火延遲時間，進而降低 NO_x 排放以及引擎噪音)、低硫份以及低芳香烴。

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研討會議題及論文目錄

一、背景與目的

隨著化石能源日漸衰竭以及全球對溫室效應氣體減量之呼聲日益殷切，世界各國主要能源業者、油公司以及車輛業者無不盡全力設法因應。造成近幾年來在車輛及引擎設計、污染排放防制機制、車輛新能源之利用、以及節能技術(CO₂ 排放減量)等日新月異發展迅速。本次出國主要參加在日本京都由美國汽車工程師協會(SAE)與日本 JSAE 所舉辦之「2011 車用燃料與引擎新技術國際研討會」。

二、行程簡述

本次出國期間自 100 年 8 月 29 日至 100 年 9 月 3 日止共計六天。8/29 由桃園國際機場搭乘長榮 BR-2132 班機抵日本關西機場後，轉搭日本 JR 高鐵至京都(Kyoto)，當日晚上參加由主辦單位日本自動車工程師協會(JSAE)舉辦之歡迎酒會；8/30~9/2 則參加在京都 TERRSA 會議中心舉辦之 2011 年車用燃料與引擎新技術國際研討會；9/3 則再搭乘 JR 高鐵轉關西機場，並搭乘長榮 BR-2131 班機返回台北。

三、研討會議程與研討內容

3.1 研討會議程

本次於日本京都 TERRSA 會議中心舉行之 2011 年車用燃料與引擎新技術國際研討會，包含專題演講、學術及技術論文發表、以及特定議題工作小組討論(Special Workshop)之外，並安排有低污染、高效率先進引擎、車輛用油(包含燃料與機油)添加劑展覽攤位、以及因應歐

盟六期排放法規(EURO-6)所開發的一系列車上即時汙染排放檢測系統等(相關議題及目錄如附錄一)，本次會議依據現場出席人數估計約有300多人參加。其中以車輛製造業者佔多數，油公司及添加劑相關業者次之。

3.2 會議研討內容

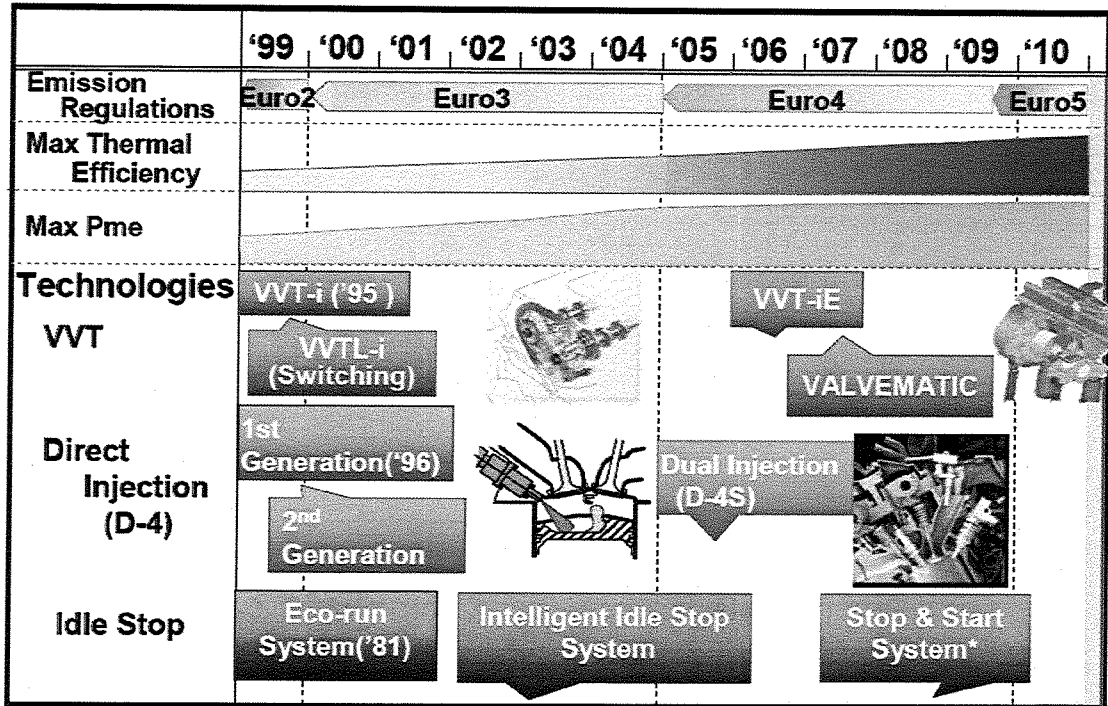
在京都 TERRSA 會議中心舉行之 2011 年車用燃料與引擎新技術國際研討會中，首先最引人注目的是美國及日本車廠在報到處所展示的多款省能低汙染引擎，可惜炫耀成分居多，現場不僅嚴禁拍照，亦不提供詳細技術資料。口頭詢問展示接待人員，對方亦以英文聽力不佳為由，不願詳實回答。

而在學術、技術研討會以及特定議題工作小組討論會議當中，由於多場次同時進行並無法一一參與。以下僅就所參與的幾場與目前工作領域較為相關的研討專題略述如下：

3.2.1 車用引擎新技術發展

因應能源多元化以及溫室效應氣體減量需求，本研討會有多篇論文探討車輛引擎未來可能之技術發展趨勢。儘管低碳燃料(如 CNG、LPG 等)、生質燃料(如酒精汽油、生質柴油)、以及油氣雙燃料車、甚或電動車(HEV、PHEV、BEV)、燃料電池等已被積極的研發應用，不過人類對於使用超過一百年的熟悉燃料(汽油、柴油)仍然是短期內無可替代的車用能源首選。

綜合整理各家車廠所發表之論文，因應日趨嚴格的污染排放法規，汽油車輛引擎發展之新技術大致如下圖所示：

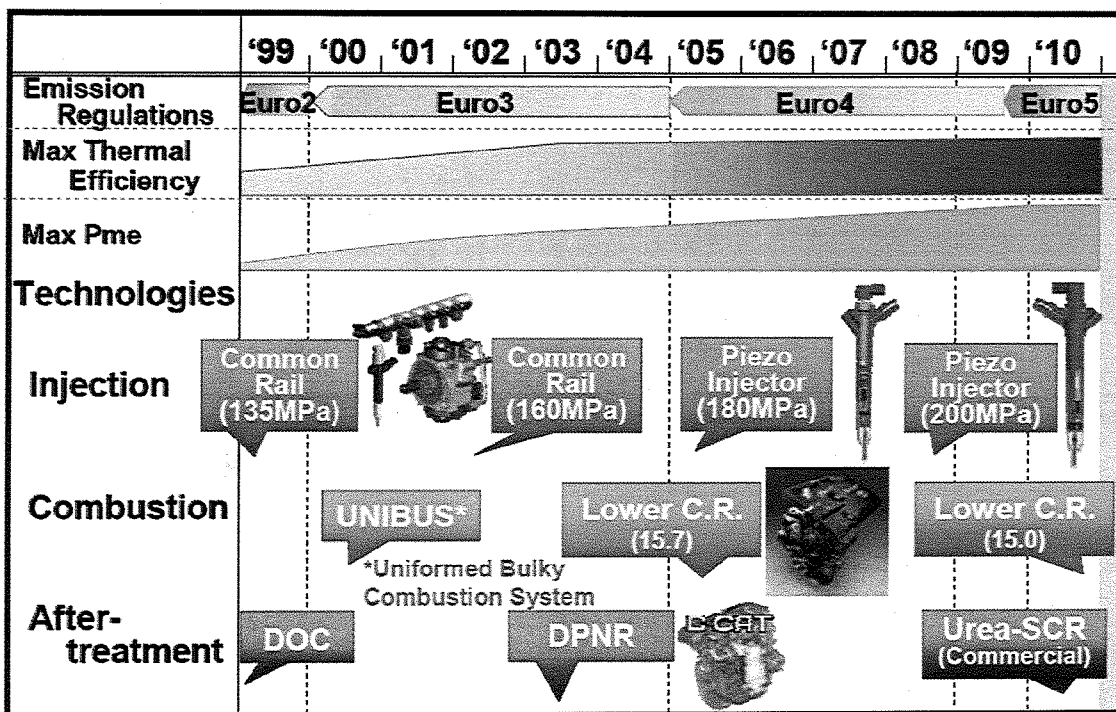


在 2000 年之前車廠為了符合歐盟 Euro-2/3 排放法規，主要應用可變汽門(Variable Valve Timing, VVT)技術並且開始發展第 1/2 代的汽油直噴供油(Gasoline Directed Injection, GDI)技術。2000 年之後，因應 Euro3 排放法規，為求節能、減排又陸續引進 Eco-run 以及智慧型的情速控油熄火裝置；而因應自 2005 年開始的 Euro5 排放法規，電子感應式可變汽門(VVT-iE)以及全自動可變汽門(Valvematic)技術，以及智慧型的路口紅燈自動 Stop & Start 系統等技術更是被各車廠積極研發使用。

此外，綜合整理各家車廠所發表之論文，未來柴油車輛引擎發展之新技術大致如下圖所示

技術較不成熟，供油壓力亦低(約 135MPa 左右)；而此時柴油引擎專用的氧化觸媒轉化器(DOC)也開始應用來降低柴油引擎的粒狀污染排放物。

自 2000 年開始的 Euro3 以後，共軌噴射系統朝著更高壓力發展(達到 180MPa 以上)，而各車廠燃燒系統的一元化開發以及 DPNR(Diesel PM & NOx Reduction) 排氣後處理裝置亦被引進同時減低粒狀排放物以及氮氧化物的排放。而自 2005 年之後，因應日趨嚴苛的排放管制法規，柴油引擎更朝向低壓縮比設計 (註:柴油引擎壓縮比降低固然可能導致碳氫化合物以及一氧化碳排放增加，但對於較難處理之 NOx 排放具備減量效果)。



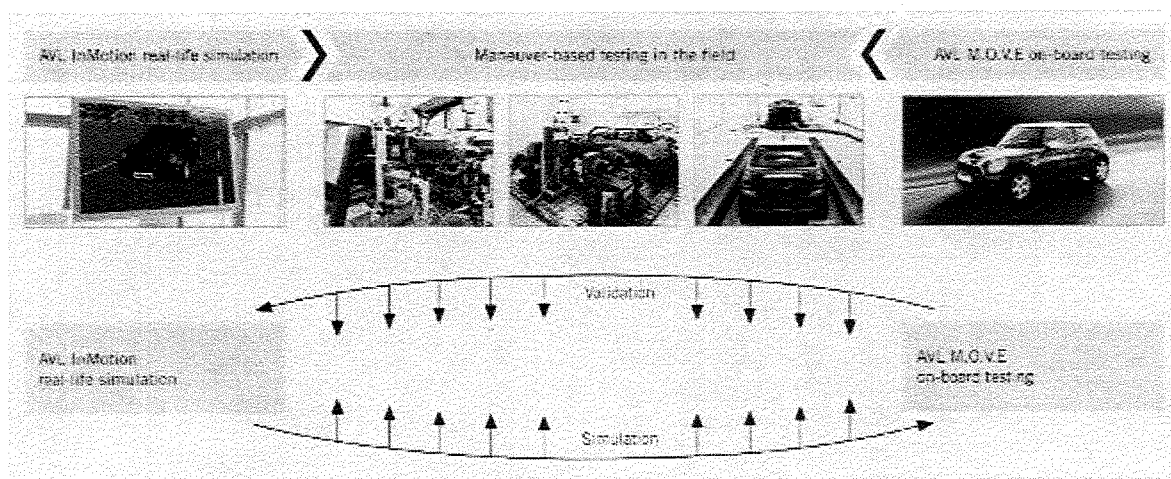
而對應更嚴格的歐洲 5/6 期車輛排放法規，有多家車廠已經陸續將 Piezo Injector 的技術應用到新一代的共軌噴射技術中。(註: Piezo Crystals 材料對於供油壓力變化之速度比傳統 CRi 系統中，管控噴油之 Solenoid Valve 速度快 5 倍；而使用 Piezo Crystals 作為噴油嘴開關滑道之介質，由於無傳統金屬材質之機械摩擦阻力，供油開關作動速度更

較傳統 CRi 系統快一倍)。

3.2.2 因應車輛新技術之檢測系統演進

車輛市場面臨降低污染排放、燃油效率最佳化、燃料使用多元化以及駕駛性能提昇等多方需求，新一代車輛使用複合動力系統的情形日益普及。如何評估包含傳統內燃機、電動馬達、電池以及複合控制傳動系統等在未來新一代車輛之整體表現，已成為車輛研發相關業界必須面對之問題。

而上述相關動力提供或傳遞系統，在個別開發、生產「上游端」之性能管控，並無法確保未來在成車「應用端」的綜合表現。因此，近幾年所謂「Real-Life Testing System」因應而生。本次研討會包含日本 Horiba 公司以及奧地利 AVL 公司均發表相關系統資訊。而 AVL 更詳細介紹其車上移動式偵測系統(M.O.V.E. on Board Testing System)。該系統可以同時記錄行駛中車輛的瞬間污染排放、耗能狀況、引擎及時燃燒效率、以及車輛傳動系統之駕駛性能反應等。



M.O.V.E 系統可以將傳統上必須經過實車路況駕駛型態蒐集、再在實驗室回歸模擬，並需動用大量昂貴設備才能進行的實車「模擬」測試，很容易的變成「真正而即時」的檢測任何複合動力車輛在實際「應用端」的綜合表現。

美國環保署已經正式認可此一種新的測試方法與相關法規測試程序。我國行政院環保署今年度亦已經委託鼎環顧問公司，引進相關系統，先就污染排放部份進行實車測試。未來國內可望參照美國 EPA 採納此一與過去數十年以來全然不同的車輛污染排放管制與檢測方式。

3.2.3 柴油噴油嘴積污問題探討

有鑒於世界各國生質柴油的添加比例陸續增高以及共軌噴射供油系統的大量採用，在本次研討會中有一個單元特別討論柴油引擎噴油嘴積污問題，過去數年來以美國為主的各國車廠均深受柴油噴嘴阻塞問題之客訴問題所困擾。

根據 Cummins 公司發表的論文表示：共軌噴射供油系統之噴油嘴供油通路空間狹窄，加以 CRi 系統一般設計之燃料回流量較傳統引擎為少，導致系統平均溫度較傳統供油系統為低，更易造成噴嘴內孔或內通路之阻塞。整理相關論文摘要如下：

一般柴油引擎之噴油嘴積污主要有三種型式：

(1) Carbonaceous (Hard Carbon)

- Can result in fueling and power loss over time

(2) Lacquer/Varnish or Polymeric

- May originate from polymeric additive such as PIBSI
- Reported to cause internal injector deposits and sticking in light duty engines.

(3) Carboxylate or Organic Soaps

以上三種以燃料產生 Carboxylate Soap 時對車輛引擎性能影響最為困擾。其原因如下：

- 它可能造成無預警的引擎失能 (噴油嘴卡死時)。
- 可能引起更進一步的引擎損害 (當卡死的噴油嘴再打開瞬間)。
- 可能被迫必須更換整組噴油嘴系統。
- 造成損害時，分析柴油品質依然合乎 ASTM D975 的最低品質規範要求。
- 造成消費者對車輛引擎及油品品質的不滿與失望。

針對此一問題，國際間各相關單位 (包括 Bosch、Infineum、Lubrizol、Afton、Innospec 等噴嘴系統製造商以及添加劑廠商；SAE、CRC、EMA 以及歐洲標準委員會 CEN 等單位) 均投入相當心力設法解決。其中 CRC (Coordinating Research Council) 更成立一個包含問題確認、燃料取樣分析以及引擎測試等三階層的聯合工作小組。

迄今為止，上述單位初步進度包括：

- 問題分屬不同地區、不同屬性；尚無法歸納出一個通例以探討共同原因。
- 噴油嘴製造商認為應屬於燃料的問題。
- 石油業者認為現行柴油品質規範未能如航空燃油一般的嚴謹，無法涵蓋噴嘴積污問題之避免。
- 儘管添加劑業者提出若干個案之解決方法，但就長期來看並無法有效避免此一問題。
- 迄今並無法發展出一種 Industry-wide 可接受的 bench 或引擎測試方法。

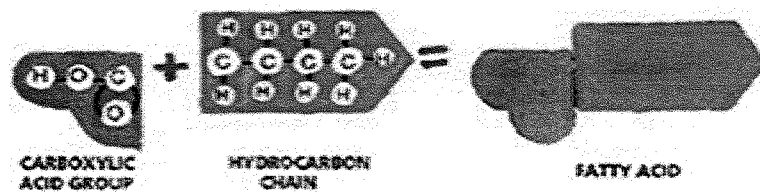
美國康明斯引擎共軌供油系統(Cummins Modular Common Rail Fuel System, MCRS)噴嘴阻塞問題探討：客訴問題包括馬力下降、排放黑煙、燃料回火、啟動困難或無法啟動等，甚至有引擎因此造成損壞。

檢討造成問題的原因發現主要在於部分 Carboxylate 或有機皂化物生成囤積在導引閥門(Pilot Valve)之滑動間隙，造成 Pilot Valve 卡死以及噴油嘴失效（Pilot Valve 可能卡死在打開時或關閉時）。

Open Sticking: 燃料隨排氣排出、造成回火、排放黑煙或白煙、引擎無法啟動等。

Close Sticking: 造成馬力下降、排放黑煙、運轉不穩定等。

生成皂化物的三種成分包括: Acid、Hydrocarbon、Base。



Carboxylate Soap 是一種由有機酸與鈉或元素鈣經過化學反應的生成物；而有機酸的來源可能來自因為 ULSD(超低硫柴油)導入所必須添加的潤滑性添加劑(Lubricity enhancer)、腐蝕抑制劑、或燃料長期儲存的衍生物質(Fuel-Ageing Products)。

Carboxylate Soap 具備高黏度以及高極性之特質，其附著於金屬表面形成結膠(gums-up)；銅及鋅兩種金屬材質會加速此一化學反應。

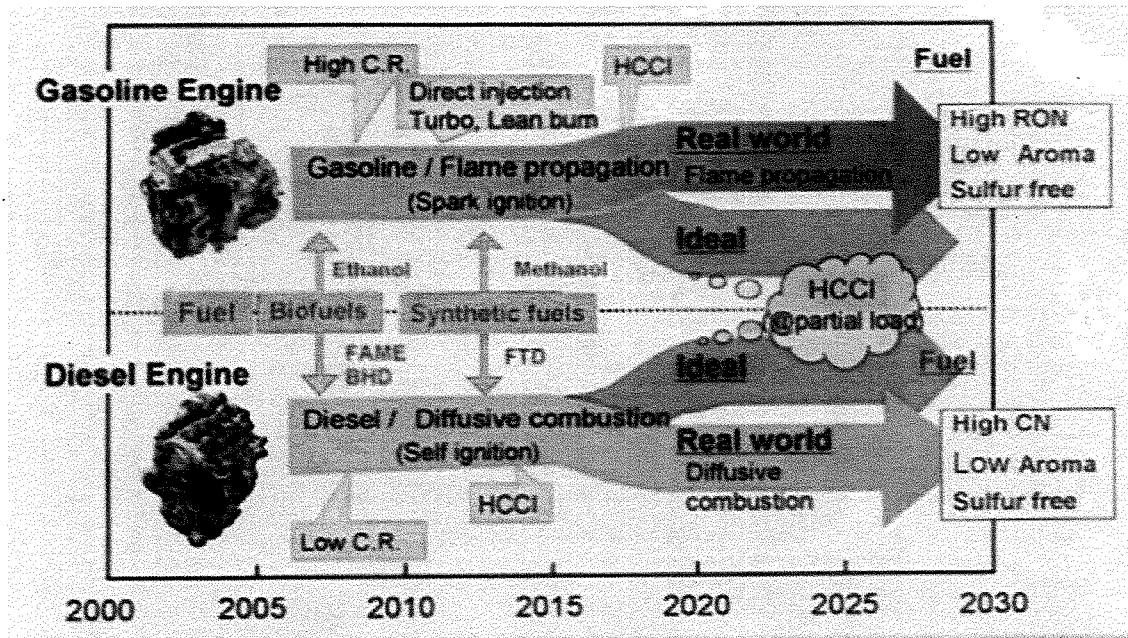
生成皂化物的第二種成分 Hydrocarbon 一部分來自燃料本身，燃料中微生物質遇水而滋生。而 Base 鈉及鈣鹽則來自於煉製過程中所添加之拔水劑。Sodium Carboxylate Soaps 成分只要很低的濃度 (<10ppm) 就可能造成上述噴油嘴阻塞問題。噴油系統製造商(如 Bosch) 建議柴油當中所含之 Na 及 Ca 最好能控制在 << 1ppm。

而在 Acid 部分，Cummins 研究顯示：在輸油管線中普遍作為腐蝕抑制劑的雙酸類(如 DDS Acid, DDSA)，較單酸類（一般作為潤滑添加劑)更容易造成噴油嘴之內部積污。不過，噴油系統製造商 Bosch 的研究卻顯示 Mono-Acid 較容易造成噴油嘴積污。

3.2.4 因應車用引擎新技術之燃料需求

TOYOTA 車廠以及日本自動車協會(JAMA)綜合整理近兩年來各大車廠對於因應未來相關環保及能源法規可能之技術演進資料。

在汽油車引擎技術上大致將朝提高引擎壓縮比、採用渦輪增壓、稀薄燃燒、直接噴射供油以及 HCCI 供油等方式發展。(註: HCCI: Homogeneous Charge Compressed Ignition, 亦即它的點火過程同柴油發動機相類似, 通過活塞壓縮混合氣使之溫度升高至一定程度時自行燃燒)。



而在柴油引擎技術部份，由於未來氮氧化物的排放將會是最難以克服的門檻，未來則大致將會朝降低引擎壓縮比，讓 HC、CO 酌量提高，去換取 NOx 的降低，以求符合未來嚴苛的污染排放法規。

援此，TOYOTA 車廠以及日本自動車協會認為因應未來汽、柴油車輛及引擎之技術發展，汽油品質將需要具備高辛烷值、低硫份以及低芳香烴；而車用柴油則將需要朝著高十六烷值(可以有效縮短柴油引

擎點火延遲時間，進而降低 NOx 排放以及引擎噪音)、低硫份以及低芳香煙。

三、研習心得與建議

- 1、未來汽油引擎技術將朝提高引擎壓縮比、採用渦輪增壓、稀薄燃燒、直接噴射供油以及 HCCI 供油等方式發展。柴油引擎未來則大致將會朝降低引擎壓縮比，讓 HC、CO 酌量提高，去換取 NOx 的降低，以求符合未來嚴苛的污染排放法規。
- 2、隨著新一代車輛使用複合動力系統的情形日益普及，Real-Life Testing System 將會是評估包含傳統內燃機、電動馬達、電池以及複合控制傳動系統等整體表現之利器。美國環保署已經正式認可此一種新的測試方法與相關法規測試程序，我國已引進相關系統，未來國內可望採納此一新的車輛污染排放管制與檢測方式。
- 3、因應未來汽、柴油車輛及引擎之技術發展，汽油品質將需要具備高辛烷值、低硫份以及低芳香煙；而車用柴油則將需要朝著高十六烷值(可以有效縮短柴油引擎點火延遲時間，進而降低 NOx 排放以及引擎噪音)、低硫份以及低芳香煙。
- 4、柴油巴士及輕型柴油商用車，未來將被 HV、EV、PHEV 等動力所取代，但考量電池容量與重量問題，重型貨車短期內仍將維持以柴油為主要燃料；如何改善柴油引擎之燃燒效率是各車廠必須儘早解決之課題。
- 5、各國生質柴油的添加比例陸續增高以及共軌噴射供油系統的大量採用，造成引擎噴油嘴內孔或內通路積污阻塞問題十分嚴重。公司柴油即將採購添加清淨添加劑(著重於噴油孔外部積污之改善)，建議未來開發新添加劑配方時，必須同時考量其對噴嘴內部之去污效果。

附 錄

研討會議題及論文目錄

ORGANIZERS FOR TECHNICAL SESSIONS

Electrical Propulsion

Technical Chair: Shoichi Sasaki, Keio University

EP1 Organizers:

Shoichi Sasaki, Keio University; Takeshi Miyamoto, Nissan Motor; Sergey Gladyshev, Michigan Dearborn University

EP2 Organizers:

Takemi Chikahisa, Hokkaido University; Yasuyuki Sando, Honda R&D

EP3 Organizers:

Takeshi Kato, Honda R&D; Terunao Kawai, National Traffic Safety and Environment Laboratory

HCCI Combustion

Technical Chair: Norimasa Iida, Keio University

HC1 Organizers:

Norimasa Iida, Keio University; Tomonori Urushihara, Nissan Motor; Hiroshi Kawanabe, Kyoto University; Nebojsa Milovanovic, Delphi

HC2 Organizers:

Akira Kato, Honda R&D; Bengt Johansson, Lund University

HC3 Organizers:

Atsumu Tezaki, Toyama University; Kazunari Kuwahara, Osaka Institute of Technology

HC4 Organizers:

Gen Shibata, Hokkaido University; Yasuhiro Urata, Honda R&D

Diesel Combustion

Technical Chair: Jiro Senda, Doshisha University

DC1 Organizers:

Kazutoshi Mori, Teikyo University; Yoshiyuki Kidoguchi, Tokushima University; Keiichi Tsujimoto, Yanmar; Tarek Abdel-Salam, East Carolina University; Rinaldo Caprotti, Infineum UK

DC2 Organizers:

Jiro Senda, Doshisha University; Noboru Uchida, Hino Motors; Raul Payri, Universidad Politecnica de Valencia

DC3 Organizers:

Takuji Ishiyama, Kyoto University; Kazuhisa Inagaki, Toyota Central R&D Laboratory; Efthimios G. Pariotis, Hellenic Naval Academy

SI Combustion

Technical Chair: Eiichi Murase, Kyushu University

SC1 Organizers:

Eiichi Murase, Kyushu University; Kenjiro Nakama, Suzuki Motor; Simona S. Merola, Instituto Motori - CNR

SC2 Organizers:

Seiichi Shiga, Gunma University; Masafumi Mori, Daihatsu Motor; David L. S. Hung, University of Michigan-Shanghai Jiao Tong University Joint Institute

SC3 Organizers:

Toshiaki Kitagawa, Kyushu University; Hiroyuki Yamamoto, Mazda Motor

Fuels for CI Engines

Technical Chair: Hideyuki Ogawa, Hokkaido University

FD1 Organizers:

Hideyuki Ogawa, Hokkaido University; Paul Richards, Innospec; Amer A. Amer, Saudi Aramco

FD2 Organizers:

Paul Richards, Innospec; Kazuki Fukuda, JX Nippon Oil & Energy; Koji Yamane, The University of Shiga Prefecture; Teruo Suzuki, JX Nippon Oil & Energy; Rinaldo Caprotti, Infineum UK; Hirohiko Hoshi, Toyota Motor; Mitsuru Konno, Ibaraki University

FD3 Organizer:

Takahiro Sako, Osaka Gas

Fuels for SI Engines

Technical Chair: Eiji Tomita, Okayama University

FS1 Organizers:

Eiji Tomita, Okayama University; Taizo Kitada, Mitsubishi Motors; Sebastian Verhelst, Ghent University

FS2 Organizer:

Toshio Shudo, Tokyo Metropolitan University

FS3 Organizers:

Toru Nakazono, Yanmar; Thomas Wallner, Argonne National Laboratory; Kiyoshi Kawasaki, The University of Shiga Prefecture

New Powertrains

Technical Chair: Akio Yoshimatsu, Toyota Motor

NP1 Organizer:

Masatoshi Shimoda, Hino Motors

NP2 Organizers:

Akio Yoshimatsu, Toyota Motor; Yuichi Suzuki, Yamaha

NP3 Organizer:

Yoshihiro Iwashita, Toyota Motor

NP4 Organizer:

Yuichi Shimasaki, Toyota Motor

NP5 Organizer:

Kazutosi Nozaki, Toyota Motor

Controls and Measurements

Technical Chair: Yasuo Moriyoshi, Chiba University

CM1 Organizers:

Yasuo Moriyoshi, Chiba University; Maruthi Devarakonda, Pacific Northwest National Laboratory; Tetsuya Aizawa, Meiji University

CM2 Organizers:

Nobuyuki Kawahara, Okayama University; Oivind Andersson, Lund University

CM3 Organizers:

Masataka Arai, Gunma University; Hiroshi Nakamura, Horiba

CM4 Organizers:

Hidenori Kosaka, Tokyo Institute of Technology; Gang Sheng, University of Alaska Fairbanks

Emissions

Technical Chair: Naoki Shimazaki, Isuzu Advanced Engineering Center

E1 Organizers:

Naoki Shimazaki, Isuzu Advanced Engineering Center; Jin Kusaka, Waseda University; Cary Henry, Cummins; Timothy V. Johnson, Corning Incorporated; Katunori Hanamura, Tokyo Institute of Technology; Masahito Shibata, Johnson Matthey Japan

E2 Organizers:

Hisashi Akagawa, UD Trucks; Hisakazu Suzuki, National Traffic Safety and Environment Laboratory

E3 Organizers:

Masayuki Yasuoka, Nissan Motor; Koji Morikawa, Fuji Heavy Industries

Lubricants

Technical Chair: Keiichi Koseki, TonenGeneral Sekiyu K.K.

L1 Organizers:

Akira Yaguchi, JX Nippon Oil & Energy; Alain Paul Gauthier, Total - Centre de Recherche

L2 Organizers:

Eiji Nagatomi, Showa Shell Sekiyu K.K.; Jai Bansal, Infineum USA LP

L3 Organizers:

Akemi Ito, Tokyo City University; Michael E. Huston, Lubrizol Additives

L4 Organizers:

Makoto Maeda, Jatco; Alain Bouffet, Total - Centre de Recherche

L5 Organizers:

Minoru Yamashita, Toyota Motor; Willem van Dam, Chevron Oronite

L6 Organizers:

Hitoshi Hamaguchi, Evonik Degussa Japan; Moritsugu Kasai, Idemitsu Kosan

L7 Organizers:

Masabumi Masuko, Tokyo Institute of Technology; Alain Bouffet, Total - Centre de Recherche

L8 Organizers:

Satoshi Ogano, ExxonMobil; Gaurav Bhalla, Chevron Oronite

10:45 JSAE 20119334 / SAE 2011-01-1761
Characteristics of HCCI Combustion in Homogenized Temperature Fields using a Super Rapid Compression Machine
 Tomohiro Hasegawa, Masamitsu Kinoshita, Kou Sato, Toru Arima, Mitsuki Tanabe, Nihon University

11:15 JSAE 20119041 / SAE 2011-01-1762
An Investigation of the Potential of EGR Stratification for Reducing Pressure Rise Rate in HCCI Combustion by using Rapid Compression Machine
 Ryo Odajima, Daisuke Shirota, Norimasa Iida, Keio University

11:45 JSAE 20119230 / SAE 2011-01-1763
Fuel Effects on HCCI Operation in a Spark Assisted Direct Injection Gasoline Engine
 Wai K Cheng, Kevin Cedrone, MIT; Samir Chahine, John Williams, BP International, Ltd.; Brad Vander Wege, Ford Motor Company

FD1-1: Fuel Effects on CI Combustion 1 (Injector Deposit)
 Conference Rm. 3K

Chairpersons:
 Paul Richards, Innospec
 Hideyuki Ogawa, HOKKAIDO UNIVERSITY

10:15 JSAE 20119127 / SAE 2011-01-1924
Investigations on Deposit Formation in the Holes of Diesel Injector Nozzles
 Andreas Birgel, Nicos Ladommatos, Pavlos Aleiferis, University College London; Nebojsa Milovanovic, Paul Lacey, Delphi Diesel Systems; Paul Richards, Innospec Limited

10:45 JSAE 20119075 / SAE 2011-01-1925
Internal Fuel Injector Deposits
 Paul Lacey, Sandro Gail, Jean Marc Kientz, Nebojsa Milovanovic, Christian Gris, Delphi Diesel Systems

11:15 JSAE 20119126 / SAE 2011-01-1923
Diesel Injector Deposits – An Issue That Has Evolved with Engine Technology
 Jim Barker, Paul Richards, Innospec Ltd; Colin E Snape, William A Meredith, University of Nottingham

11:45 JSAE 20119110 / SAE 2011-01-1927
Protecting Diesel Fuel Injection Systems
 Rinaldo Caprotti, Nadia Bhatti, Infineum UK Ltd.; Nobuyuki Ishibe, Infineum Japan

EP1-1: Battery Electric Vehicles
 Conference Rm. 3B

Chairpersons:
 Shoichi Sasaki, Keio University
 Takemi Chikahisa, HOKKAIDO UNIVERSITY

10:15 JSAE 20119273 / SAE 2011-01-1740
New Battery Monitoring Unit for HEV/EV Lithium-ion Battery
 Junichi Kawase, DENSO CORPORATION

10:45 JSAE 20119052 / SAE 2011-01-1741
Thermodynamic Study on the Solubility of NaBH₄ and NaBO₂ in NaOH Solutions
 Rui Chen, Loughborough University

11:15 JSAE 20119089 / SAE 2011-01-1742
Investigation on the Performance of a Mechanistic Electric Turbocharger Model for a Vehicular Fuel Cell System
 Steffen Dehn, Christian Duell, Daimler AG; Sharath Srinivas, Avi Anthony Cornelio, Mercedes Benz Research & Development India (P) Ltd

11:45 JSAE 20119068 / SAE 2011-01-1743
An Analysis of Trends in Vehicle Technologies Based on Alternative Fuels: Battery Electric Vehicles and Fuel Cell Electric Vehicles
 Abhinav Jain, Delhi College of Engineering, India; Stuti Agrawal, University of Auckland

DC1-2: CI Combustion 2
 Seminar Rm. 2A+B

Chairpersons:
 Yoshiyuki Kidoguchi, The University of Tokushima
 Jiro Senda, Doshisha University

13:45 JSAE 20119298 / SAE 2011-01-1813
Effects of Nozzle Hole Diameter and Injection Pressure on Flame Lift-Off and Soot Formation in D.I. Diesel Combustion
 Wu Zhang, Mazda Motor Corporation; Jiang-Ping Tian, Keiya Nishida, University of Hiroshima

14:15 JSAE 20119355 / SAE 2011-01-1814
An Empirical Study to Extend Engine Load in Diesel Low Temperature Combustion
 Usman Asad, Xiaoye Han, Ming Zheng, University of Windsor

14:45 JSAE 20119270 / SAE 2011-01-1816
Droplet Size and Velocity Characteristics of the Ignition Quality Tester (IQT™) Fuel Spray
 Stephane Gilles Daviault, Edgar Akio Matida, Carleton University; Michael Muron Karakolis, Gary D. Webster, Advanced Engine Technology AET Ltd.

15:15 JSAE 20119354 / SAE 2011-01-1817
Empirical Study of Energy in Diesel Combustion Emissions with EGR Application
 Kelvin Xie, Ming Zheng, Xiaoye Han, Usman Asad, Graham T. Reader, University of Windsor

SC3-2: SI Modeling 2
 Seminar Rm. 2C

Chairpersons:
 Hiroyuki Yamamoto, Mazda Motor
 Toshiaki Kitagawa, Kyushu University

13:45 JSAE 20119179 / SAE 2011-01-1894
Evaluation of a 0D Phenomenological SI Combustion Model
 Andrei Boiarciuc, Alain Floch, Renault SAS

14:15 JSAE 20119330 / SAE 2011-01-1895
Combustion Control Chemical-Kinetics Studies with Natural Gas in HCRI Enhanced Four-Stroke DI SI
 David Alan Blank, HCRI Technologies International, LLC

14:45 JSAE 20119069 / SAE 2011-01-1896
Modelling of Gasoline and Ethanol Hollow-Cone Sprays Using OpenFOAM
 Chen Huang, Andrei Lipatnikov, Chalmers University of Technology

FD1-2: Fuel Effects on CI Combustion 2 (Combustion and Emissions 1)

Chairpersons:

Hideyuki Ogawa, HOKKAIDO UNIVERSITY
Paul Richards, Innospec

Conference Rm. 3K

14:15

Oral Only

Dependence of Premixed Low-Temperature Diesel Combustion on Fuel Ignitability and Volatility

Tie Li, Hideyuki Ogawa, HOKKAIDO UNIVERSITY

The content of this presentation is published in International Journal of Engine Research.

14:45

JSAE 20119071 / SAE 2011-01-1921

Experimental Investigation of Diesel and Surrogate Fuels: Spray and Ignition Behavior

Maung Maung Aye, Joachim Beeckmann, Norbert Peters, Heinz Pitsch, Anyelo Vanegas, RWTH Aachen University

15:15

JSAE 20119117 / SAE 2011-01-1922

The Impact of Saturated and Unsaturated Fuel Molecules on Diesel Combustion and Exhaust Emissions

Paul Robert Hellier, Nicos Ladommatos, University College London; Robert Allan, Marc Payne, John Rogerson, BP Global Fuels Technology

FS2: Fuels for SI Engines: Biofuels and Fundamental

Conference Rm. 3B

Chairperson:

Toshio Shudo, Tokyo Metropolitan University

13:45

JSAE 20119169 / SAE 2011-01-1991

Analysis of the Effect of Bio-Fuels on the Combustion in a Downsized DI SI Engine

Matthias Thewes, Adrien Brassat, Stefan Pischinger, Andreas Sehr, FEV Motorentechnik GmbH; Martin Muether, RWTH Aachen University

14:15

JSAE 20119176 / SAE 2011-01-1992

Performance Analysis of SI Engine Fueled by Ethanol Steam Reforming Products

Leonid Tartakovskiy, Vladimir Baibikov, Marcel Gutman, Albert Mosyak, Mark Veinblat, Technion - Israel Institute of Technology

14:45

JSAE 20119123 / SAE 2011-01-1997

Numerical Calculation of Quench Distance for Laminar Premixed Flames Under Engine Relevant Conditions

Marco Antonio Turcios, Carl Ollivier-Gooch, The University of British Columbia; Jim Huang, Westport Innovations

DC1-3: CI Combustion 3

Seminar Rm. 2A+B

Chairperson:

Jiro Senda, Doshisha University

16:00

JSAE 20119067 / SAE 2011-01-1818

Injection Nozzle Coking Mechanism in Common-rail Diesel Engine

Masato Ikemoto, Kazuhiro Omae, TOYOTA MOTOR CORPORATION; Kyoko Nakai, Reiko Ueda, Toyota Central R&D Labs., Inc.; Nobuhisa Kakehashi, DENSO CORPORATION; Kazuo Sunami, Nippon Soken, Inc.

16:30

JSAE 20119165 / SAE 2011-01-1819

Effects of Injection Pressure and Ambient Gas Density on Fuel - Ambient Gas Mixing and Combustion Characteristics of D.I. Diesel Spray

Jingyu Zhu, Olawole Abiola Kuti, Keiya Nishida, University of Hiroshima

17:00

JSAE 20119261 / SAE 2011-01-1820

Combustion Characteristics of Emulsified Blends of Aqueous Ethanol and Diesel Fuel in a Diesel Engine with High Rates of EGR and Split Fuel Injections

Hari Setiaprada, Takuma Ozawa, Kosuke Hara, Kenji Yamazaki, Hideyuki Ogawa, HOKKAIDO UNIVERSITY

17:30

JSAE 20119104 / SAE 2011-01-1821

In-cylinder Optical Investigation of Combustion Behavior on a Fast Injection Rate Diesel Common Rail Injector

Katsuya Matsuura, Osamu Suzuki, Akira Kato, Honda R&D Co., Ltd. Automobile R&D Center

SC3-3: SI Modeling 3

Seminar Rm. 2C

Chairpersons:

Toshiaki Kitagawa, Kyushu University
Hiroyuki Yamamoto, Mazda Motor

16:00

JSAE 20119192 / SAE 2011-01-1897

Study of the Portability of a 3D CFD Model for the Dynamics of Sprays Issuing from Multi-Hole GDI Injectors

Luigi Allocca, Michela Costa, Alessandro Montanaro, Ugo Sorge, Istituto Motori - CNR

16:30

JSAE 20119204 / SAE 2011-01-1898

Comparison of 0D and 1D Duct System Modeling for Naturally Aspirated Spark Ignition Engines

Alix Guillaume, Cecile Pera, Julien Bohbot, IFP Energies Nouvelles; Alessandro Baldari, LMS International

17:00

JSAE 20119321 / SAE 2011-01-1899

A Comprehensive Modeling and Simulation of Gasoline Direct Injection using KIVA-4 Code

Kaushal Prasad Nishad, Amsini Sadiki, Johannes Janicka, EKT, Technische Universität Darmstadt, Germany

L7: New Lubricants and Additive Development,

L8 Rheology, Lubrication and Material Technologies

A/V Study Rm. 2E

Chairpersons:

Alain Bouffet, Total - Centre de Recherche
Masabumi Masuko, Tokyo Institute of Technology

16:00

JSAE 20119031 / SAE 2011-01-2131

Frictional Properties of Molybdenum-Based Lubricating Oil Additives Using Green Chemistry

Gaurav Bhalla, Man Hon Tsang, David Gao, Qunlai Chen, William Ruhe, Chevron Oronite Company LLC; Nobuo Ushioda, Chevron Japan Ltd.

16:30

JSAE 20119056 / SAE 2011-01-2132

Tribological Properties of Sulphur-Free Antiwear Additives Zinc Dialkylphosphates (ZDPs)

Koji Hoshino, Kazuhiro Yagishita, Kazuo Tagawa, JX Nippon Oil and Energy Corporation; Hugh Spikes, Imperial College

17:00

JSAE 20119366 / SAE 2011-01-2133

Preparation and Performance of a Biobased Lubricating Grease

George S. Dodos, George Anastopoulos, Fanourios Zannikos, Eviropidis Lois, National Technical University of Athens, Greece

17:30

JSAE 20119073 / SAE 2011-01-2134

Application of a Split Lubrication Gasoline Engine to the Screening and Understanding of Friction Modifier Behaviour

Stephen Nattrass, Anthony Davenport, Shell Global Solutions (UK)

EP3: Hybrids

Seminar Rm. 2C

Chairpersons:

Takeshi Kato, Honda R&D
Terunao Kawai, National Traffic Safety and Environment
Laboratory

9:30 JSAE 20119010 / SAE 2011-01-1744

Design and Optimization of Plug-in Hybrid Electric Vehicle Energy Management Strategy

Bo Zhang, Cheng Wang, Yu Guan, China Automotive Technology & Research Center; Shichun Yang, Beijing University of Aeronautics and Astronautics; Heyue Zheng, China Automotive Technology & Research Center

10:00 JSAE 20119036 / SAE 2011-01-1745

The Power Unit with Strong Hybrid System for Motorcycles

Yukiharu Hosoi, Yamaha Motor Co., Ltd.

10:30 JSAE 20119027 / SAE 2011-01-1747

Modelling of the Warm-up of a Spark Ignition Engine : Application to Hybrid Vehicles

Rémi Gabriel Dubouil, Jean-François Hetet, Alain Maiboom, laboratory of fluid mechanics CNRS umr6598

11:00 JSAE 20119047 / SAE 2011-01-1748

Introduction of 2011 CIVIC Hybrid System

Takeshi Saito, Takahiro Fukui, Honda R&D Co., Ltd Automobile R&D Center

11:30 JSAE 20119381 / SAE 2011-01-1750

Evaluation and Modification of Constant Volume Sampler Based Procedure for Plug-In Hybrid Electric Vehicle Testing

Li Zhang, Tim Brown, G. Scott Samuelsen, Advanced Power and Energy Program (APEP), University of California, Irvine

E1-4: Advanced Emission Aftertreatment 4

Conference Rm. 2D

Chairperson:

Naoki Shimazaki, Isuzu Advanced Engineering Center

9:30 JSAE 20119072 / SAE 2011-01-2092

HC-SCR on Silver-Based Catalyst: From Synthetic Gas Bench to Real Use

Arnaud Frobert, Stéphane Raux, IFP Energies nouvelles; Arnaud Lahougue, Christian Hamon, IRMA Technologies; Karine Pajot, Gilbert Blanchard, PSA Peugeot Citroën

10:00 JSAE 20119131 / SAE 2011-01-2093

Experimental Investigation of Applying Raw Fuel Injection Technique for Reducing Methane in Aftertreatment of Diesel Dual Fuel Engines Operating under Medium Load Conditions

Anirut Noipheng, Napumee Waitayapat, Tanet Aroonsrisopon, Ekathai Wirojsakunchai, Department of Mechanical Engineering, Kasetsart University, Thailand; Thummarat Thummadetsak, Krisada Wannatong, PTT Research & Technology Institute, PTT Public Company Limited

10:30 JSAE 20119249 / SAE 2011-01-2094

Microkinetic Modelling for Propane Oxidation in Channel Flows of a Silver-Based Automotive Catalytic Converter

Athanasios Tsolakis, Boonlue Sawatmongkhon, University of Birmingham; Andrew P.E. York, Johnson Matthey; Kampanart Theinnoi, King Mongkut's University of Technology North Bangkok

11:00

JSAE 20119254 / SAE 2011-01-2095

A New Approach in AdBlue Dosing to Improve Performance and Durability of SCR Systems for the Use in Passenger Cars up to Heavy Duty Vehicles.

Georg Hühthwohl, Sascha Doleneč, Albonair GmbH

HC2-1: HCCI Combustion (Engine Control 1)

Conference Rm. 3A

Chairpersons:

Per Tunestål, Lund University
Akira Kato, Honda R&D

9:30 JSAE 20119058 / SAE 2011-01-1772

Investigation and Comparison of Residual Gas Enhanced HCCI using Trapping (NVO HCCI) or Rebreathing of Residual Gases

Patrick Borgqvist, Per Tunestål, Bengt Johansson, Lund University

10:00 JSAE 20119077 / SAE 2011-01-1773

Effects of Injection Timing on CAI Operation in a 2/4-Stroke Switchable GDI Engine

Y. Zhang, H. Zhao, M. Ojapah, A. Cairns, Centre for Advanced Powertrain and Fuels, Brunel University London

10:30 JSAE 20119078 / SAE 2011-01-1774

Experiment and Analysis of a Direct Injection Gasoline Engine Operating with 2-stroke and 4-stroke Cycles of Spark Ignition and Controlled Auto-Ignition Combustion

Y. Zhang, H. Zhao, M. Ojapah, A. Cairns, Centre for Advanced Powertrain and Fuels, Brunel University London

11:00 JSAE 20119232 / SAE 2011-01-1775

Investigating Mode Switch from SI to HCCI using Early Intake Valve Closing and Negative Valve Overlap

Anders Widd, Rolf Johansson, Patrick Borgqvist, Per Tunestål, Bengt Johansson, Lund University

FD2-3: Alternative Fuels for CI Engines 3 (Bio-diesel Fuels 3)

Conference Rm. 3I+J

Chairpersons:

Paul Richards, Innospec
Kazuki Fukuda, JX Nippon Oil & Energy

9:30 JSAE 20119084 / SAE 2011-01-1929

Numerical Analysis of NOx Formation Trends in Biodiesel Combustion using Dynamic I-T Parametric Maps

Junfeng Yang, Valeri Golovitchev, Chalmers University of Technology; Paul Redon, J. Javier López Sánchez, CMT-Motores Térmicos, Polytechnic University of Valencia

10:00 JSAE 20119183 / SAE 2011-01-1930

Study of the Impact of High Biodiesel Blends on Engine Oil Performance

Ken-ichi Okamoto, Japan Petroleum Energy Center; Takashi Kaneko, JX Nippon Oil & Energy Corporation; Tomoaki Kakihara, Isuzu Motors Limited; Keiichi Tsuchihashi, Hino Motors, Ltd.; Masanori Okada, TOYOTA MOTOR CORPORATION; Kiminobu Hirata, UD Trucks Corporation; Tsutomu Hasegawa, Idemitsu Kosan, Co., Ltd.; Yoshiro Egashira, Cosmo Oil Co., Ltd.; Masahiko Shibuya, Showa Shell Sekiyu K.K.; Keiichi Koseki, TonenGeneral Sekiyu K.K.; Toru Kawatani, Mitsubishi Fuso Truck and Bus Corporation; Ken Matsuura, Japan Automobile Research Institute; Kyouji Hosono, NISSAN MOTOR CO., LTD.; Mamoru Miyazaki, Japan Petroleum Energy Center

14:00 JSAE 20119149 / SAE 2011-01-1872

A Study on Improvement of Indicated Thermal Efficiency of ICE Using High Compression Ratio and Reduction of Cooling Loss

Hidefumi Fujimoto, Hiroyuki Yamamoto, Masahiko Fujimoto, Hiroyuki Yamashita, Mazda Motor Corporation

14:30 JSAE 20119173 / SAE 2011-01-1873

A New Method to Simulate the Octane Appetite of Any Spark Ignition Engine

Trevor J Davies, Shell; Roger F. Cracknell, Shell Global Solutions (UK); Kathryn J. Hobbs, Timothy P. J. Riley, University of Bath; Robert A. Head, Shell Global Solutions (UK)

L4: Current Development of Transmission Fluids

A/V Study Rm. 2E

Chairpersons:

Alain Bouffet, Total - Centre de Recherche
Makoto Maeda, Jatco

13:00 JSAE 20119055 / SAE 2011-01-2121

Understanding MTF Additive Effects on Synchroniser Friction

Gareth Brown, Gary Michael Walker, William Richard Spencer Barton, Andrew Rose, Lubrizol Limited; Brian M O'connor, Michael E Huston, Lubrizol Corporation; Christopher Friend, Lubrizol Limited; Christopher McFadden, Lubrizol Corporation; Yoshiaki Higuchi, Lubrizol Japan Limited

13:30 JSAE 20119221 / SAE 2011-01-2122

Next-Generation Fluid Technology for CVT and AT

Kedar Shanker Shrestha, Kota Ibuse, Takahiro Nakagawa, Masami Fuchi, Chevron Japan Ltd.

14:00 JSAE 20119371 / SAE 2011-01-2123

Advances in Tribological Design of Poly(alkyl methacrylate) Viscosity Index Improvers

Torsten Stoehr, Boris Eisenberg, Ellen Suchert, Evonik RohMax Additives GmbH; Hugh Spikes, Jingyun Fan, Imperial College London, Department of Mechanical Engineering

E2-1: Effects of Fuels for Automotive Devices 1

Conference Rm. 2D

Chairpersons:

Hisashi Akagawa, UD Trucks
Hisakazu Suzuki, National Traffic Safety and Environment Laboratory

13:00 Oral Only / SAE 2011-01-1220

David E. Foster

13:30 JSAE 20119383 / SAE 2011-01-2100

Particulate Matter Sampling and Volatile Organic Compound Removal for Characterization of Spark Ignited Direct Injection Engine Emissions

David E. Foster, Engine Research Center, University of Wisconsin - Madison; Nicholas Matthias, Carolyn Farron, Michael Andrie, Roger Krieger, Univ. of Wisconsin-Madison; Paul Najt, Kushal Narayanaswamy, Arun Solomon, General Motors LLC; Alla Zelenyuk, Pacific Northwest National Laboratory

14:00 JSAE 20119042 / SAE 2011-01-2096

Effect of Hydrotreated Vegetable Oil (HVO) on Particulate Filters of Diesel Cars

Aaro Veikko Aukusti Kopperoinen, Matti Kytö, VTT Technical Research Centre of Finland; Seppo A. Mikkonen, Neste Oil Corporation

HC2-2: HCCI Combustion (Engine Control 2)

Conference Rm. 3A

Chairpersons:

Akira Kato, Honda R&D
Per Tunestål, Lund University

13:00 JSAE 20119085 / SAE 2011-01-1777

Characterization of Ion Signals Under Ringing Conditions in an HCCI Engine

Samveg Saxena, Jyh-Yuan Chen, Robert W. Dibble, University of California at Berkeley

13:30 JSAE 20119040 / SAE 2011-01-1779

Influence of Compression Speed on HCCI Ignition and Combustion

Masato Kanehara, Hiroki Iino, Norimasa Iida, Keio University

FD2-4: Alternative Fuels for CI Engines 4 (Bio-diesel Fuels 4)

Conference Rm. 3I+J

Chairpersons:

Teruo Suzuki, JX Nippon Oil & Energy
Rinaldo Caprotti, Infineum UK

13:00 JSAE 20119167 / SAE 2011-01-1941

Regression Equations for Predicting the Cetane Number of Biodiesel Fuel Based on Fuel Composition and Properties

Kiyoshi Kawasaki, Koji Yamane, Tatsuro Ikawa, The University of Shiga Prefecture

13:30 JSAE 20119349 / SAE 2011-01-1943

Effects of Biodiesel Fuels upon Criteria Emissions

S. Kent Hoekman, Curtis Robbins, Eric Cenicerros, Desert Research Institute; Mani Natarajan, Marathon Petroleum Company

14:00 JSAE 20119375 / SAE 2011-01-1944

FAME Blended Diesel Fuel Impacts on Engine/Vehicle Systems

Naoki Kono, TonenGeneral Sekiyu (Current Affiliation: Japan Petroleum Energy Center); Kazuo Yamamori, Takafumi Furukawa, TOYOTA MOTOR CORPORATION; Mike Noorman, ExxonMobil Research & Engineering Co

FS1-2: Fuels for SI Engines: Fuel Components

Conference Rm. 3K

Chairpersons:

Taizo Kitada, Mitsubishi Motors
Sanghoon Kook, University of New South Wales

13:00 JSAE 20119053 / SAE 2011-01-1984

The Effect of Fuel Compounds on Pre-ignition under High Temperature and High Pressure Condition

Nozomi Sasaki, Koichi Nakata, Katsunori Kawatake, TOYOTA MOTOR CORPORATION; Shunta Sagawa, Manabu Watanabe, Tadahide Sone, JX Nippon Oil & Energy Corporation

13:30 JSAE 20119155 / SAE 2011-01-1985

Fuel Effects in a Boosted DISI Engine

Trevor J Davies, Roger F. Cracknell, Shell Global Solutions (UK); Luke Cruff, John Fowler, Ricardo Inc.; Guy Lovett, Shell Global Solutions (US) Inc.

14:00 JSAE 20119229 / SAE 2011-01-1986

Correlation of Chemical Compositions and Fuel Properties with Fuel Octane Rating of Gasoline Containing Ethanol

Pat Geng, Douglas Conran, General Motors LLC

15:15 JSAE 20119097 / SAE 2011-01-2097

Future Emission Concepts Versus Fuel Quality Aspects – Challenges and Technical Concepts

Andreas Wiaralla, Ludger Ruhkamp, Yves Rosefort, Franz Maassen, Britta Sliwinski, Thorsten Schnorbus, FEV Motorentechnik GmbH; Thomas Laible, Institute for Combustion Engines, RWTH Aachen University

15:45 JSAE 20119015 / SAE 2011-01-2098

Chemical and Spectroscopic Characterization of SOF and Soot from a Euro-4 Diesel Engine Fueled by Model Fuels

Salvatore Florio, Leonardo Pellegrini, ENI S.p.A.; Michela Alfè, Anna Ciajolo, Fernando Stanzione, IRC-CNR, Consiglio Nazionale delle Ricerche

16:15 JSAE 20119214 / SAE 2011-01-2099

Characterization of PM Sampled from Inside and Outside of Diffusion Flame

Yoshihiro Kobayashi, Tokyo Denki University; Masataka Arai, Gunma University

HC3-1: HCCI Combustion (Chemical Kinetics 1)

Conference Rm. 3A

Chairpersons:

Atsumu Tezaki, Toyama University
Kazunari Kuwahara, Osaka Institute of Technology

15:15 JSAE 20119048 / SAE 2011-01-1780

Auto-ignition Kinetics of Biomass Derived Alternative Fuels for Advanced Combustion

Ravi Xavier Fernandes, RWTH Aachen University; Stijn Vranckx, Changyoul Lee, Physico-Chemical Fundamentals of Combustion, RWTH Aachen University

15:45 JSAE 20119329 / SAE 2011-01-1781

Diesel-PPC Engine: Predictive Full Cycle Modeling with Reduced and Detailed Chemistry

Martin Tunér, Lund University; Karin Fröjd, Lars Seidel, Fabian Mauss, LOGE AB, Sweden

16:15 JSAE 20119379 / SAE 2011-01-1782

Lumped Chemical Kinetic Model Based on the Detailed Analysis of Hydrocarbon Fuel Ignition

Yasuyuki Sakai, Hiromitsu Ando, University of Fukui; Kazunari Kuwahara, Osaka Institute of Technology

16:45 JSAE 20119051 / SAE 2011-01-1783

Multi-Objective Optimization of a Kinetics-Based HCCI Model Using Engine Data

Ali M. Aldawood, Sebastian Mosbach, Markus Kraft, University of Cambridge; Amer A. Amer, Saudi Aramco

FD2-5: Alternative Fuels for CI Engines 5 (Bio-diesel Fuels 5)

Conference Rm. 3I+J

Chairpersons:

Rinaldo Caprotti, Infineum UK
Teruo Suzuki, JX Nippon Oil & Energy

15:15 JSAE 20119011 / SAE 2011-01-1945

Experimental Investigation of the Effect of Esterified Karanja Oil Biodiesel on Performance, Emission and Engine Wear of a Military Heavy Duty, 118kW, Turbocharged CIDI Engine

Anand Kumar Pandey, MR Nandgaonkar, College of Engineering, Pune-411005, India

15:45 JSAE 20119033 / SAE 2011-01-1946

Transesterification Kinetics of Waste Cooking Oils over Heterogeneous Acid Catalyst for Biodiesel Production

Sathaporn Chuepeng, Cholada Komintarachat, Kasetsart University

16:15 JSAE 20119066 / SAE 2011-01-1947

Effect of Different Nozzle Geometries using Pure Rapeseed Oil in a Modern Diesel Engine on Combustion and Exhaust Emissions

Markus Lueft, KIT; Fatih Sarkoc, MOT; Uwe Wagner, Ulrich Spicher, KIT

16:45 JSAE 20119367 / SAE 2011-01-1949

Improving Biodiesel Blended Fuels: Overcoming the NOx Penalty and Enhancing the Engine's Regulated Emissions Profile.

Alexander Francis Psaila, Patrick M. Grimes, Richard L. Ellis, Alternative Petroleum Technologies, Reno Nevada

FS1-3: Fuels for SI Engines: Biofuels

Conference Rm. 3K

Chairperson:

Eiji Tomita, Okayama University

15:15 JSAE 20119264 / SAE 2011-01-1988

Determination of Mixture of Methanol and Ethanol Blends in Gasoline Fuels Using a Miniaturized NIR Flex Fuel Sensor

Alain Lunati, Oswin Galtier, SP3H

15:45 JSAE 20119281 / SAE 2011-01-1989

Auto-Ignition Characteristics of Biofuel Blends for SI Engines

Mitsuaki Ohtomo, Tetsunori Suzuoki, Kazuaki Nishikawa, Hiroshi Miyagawa, Makoto Koike, Toyota Central R&D Labs., Inc.

16:15 JSAE 20119378 / SAE 2011-01-1990

Butanol Blending– a Promising Approach to Enhance the Thermodynamic Potential of Gasoline – Part 1

Philipp Adomeit, FEV Motorentechnik; T. Niass, A. A. Amer, H. Babiker, Saudi Aramco; A. Brassat, K. Krebber-Hortmann, FEV Motorentechnik; W. Xu, Saudi Aramco

CM4: Measurements, Testing and Statistics

Conference Rm. 3B

Chairpersons:

Hidenori Kosaka, Tokyo Institute of Technology
Gang Sheng, University of Alaska Fairbanks

15:15 JSAE 20119304 / SAE 2011-01-2061

Study on Measurement Method of Driving Force Using New Type Wheel Torque Meter in On-road Driving

Susumu Sato, Toshiro Yamamoto, Yasuhiro Ogawa, National Traffic Safety and Environment Laboratory; Hiroshi Sasaki, Koyama Garage; Hiroshi Kikuri, Katsuya Kaneko, Toyo Sokki

15:45 JSAE 20119372 / SAE 2011-01-2062

Visualization of the Cavitating Flow inside the Nozzle Hole Using by Enlarged Acrylic Nozzle

Masashi Matsumoto, Y. Inoue, Graduate school of Doshisha University; E. Matsumura, TOYOTA MOTOR; Y. Kobashi, Department of Mechanical Engineering, Kanazawa Institute of Technology; J. Senda, Faculty of Science and Engineering, Doshisha University

16:15 JSAE 20119331 / SAE 2011-01-2063

An Integrated Framework of Real and Micro Simulated Driving Cycles to Evaluate a New Emissions Factors Model

Livia Della Ragione, Giovanni Meccariello, Istituto Motori CNR

10:30

JSAE 20119253 / SAE 2011-01-2024

New TOYOTA 4.8L V10 Petrol High Performance Engine for Lexus LFA

Takamitsu Okamoto, Hiroshi Kawamura, Keisuke Tsukamoto, Masakatsu Nagai, Takahiro Uchida, TOYOTA MOTOR CORPORATION; Heiji Maruyama, Yamaha Motor Co., Ltd.

11:00

JSAE 20119100 / SAE 2011-01-2023

A Single Fuel Pre-Chamber Jet Ignition Powertrain Achieving High Load, High Efficiency and Near Zero NOx Emissions

William Attard, Hugh Blaxill, MAHLE Powertrain

HC3-2: HCCI Combustion (Chemical Kinetics 2)

Conference Rm. 3A

Chairpersons:

Kazunari Kuwahara, Osaka Institute of Technology
Yasuhiro Urata, Honda R&D

9:30

JSAE 20119185 / SAE 2011-01-1784

Chemical Kinetic Mechanism of Compression Ignition Derived from Intermediate Species for PRF and Toluene/n-Heptane Fuel Systems

Hiroyuki Kosaki, Akio Yamashita, Mohd Adnin bin Hamidi, Atsumu Tezaki, University of Toyama

10:00

JSAE 20119186 / SAE 2011-01-1785

Comparison of PRF and Toluene/n-Heptane Mixture Fuel in the Mechanism of Compression Ignition using CA Resolved Sampling

Akio Yamashita, Hiroyuki Kosaki, Atsumu Tezaki, University of Toyama

FD2-6: Alternative Fuels for CI Engines 6 (HVO and GTL Fuels 1)

Conference Rm. 3I+J

Chairpersons:

Hirohiko Hoshi, TOYOTA MOTOR
Takashi Kaneko, JX Nippon Oil & Energy Corporation

9:30

JSAE 20119136 / SAE 2011-01-1950

Effect of Fischer-Tropsch Diesel on Fuel Supply System

Masachika Masuko, Yoriko Sakamoto, Nobuhiro Okabe, Showa Shell Sekiyu K.K.; Koji Kitano, Ichiro Sakata, TOYOTA MOTOR CORPORATION; Noboru Uchida, Hino Motors, Ltd.

10:00

JSAE 20119172 / SAE 2011-01-1965

Bus Fleet Operation on Renewable Paraffinic Diesel Fuel

Reijo Mäkinen, Helsinki Region Transport; Pirjo Saikkonen, Neste Oil; Arno Amberla, Proventia Emission Control; Nils-Olof Nylund, VTT Technical Research Centre of Finland; Kimmo Tapani Erkkilä, VTT Technical Research Centre of Finland

10:30

JSAE 20119239 / SAE 2011-01-1966

Emission Performance of Paraffinic HVO Diesel Fuel in Heavy Duty Vehicles

Kimmo Tapani Erkkilä, VTT Technical Research Centre of Finland; Reijo Kalevi Mäkinen, Helsinki Region Transport; Arno Heikki Amberla, Proventia Emission Control Oy; Nils-Olof Nylund, VTT Technical Research Centre of Finland; Aki Tilli, Tuomo Huikkonen, Aalto University School of Engineering; Pirjo Saikkonen, Seppo Mikkonen, Neste Oil

FS3-1: Fuels for SI Engines: CNG Engine

Conference Rm. 3K

Chairpersons:

Toru Nakazono, YANMAR
Thomas Wallner, Argonne National Laboratory

9:30

Oral Only

Performance Improvements of a Long Stroke Spark Ignition Gas Engine

Hideyuki Ogawa, HOKKAIDO UNIVERSITY; Keisuke Kimura, Keisuke Sasaki, TOYOTA MOTOR CORPORATION; Yuki Sato, Takahiro Sako, Osaka Gas Corporation

The content of this presentation is published in International Journal of Engine Research.

10:00

JSAE 20119132 / SAE 2011-01-1994

Improvement of Combustion of CNG Engine using CNG Direct Injection and Gas-jet Ignition Method

Mas Fawzi Mohd Ali, Yoshiyuki Kidoguchi, Yusuke Oka, Tomoshi Kaida, The University of Tokushima Japan

10:30

JSAE 20119171 / SAE 2011-01-1995

Potential of Concomitant Injection of CNG and Gasoline on a 1.6L Gasoline Direct Injection Turbocharged Engine

Jerome Obiols, Dominique Soleri, IFP Energies nouvelles; Nathalie Dioc, Marc Moreau, PSA Peugeot Citroen

11:00

JSAE 20119244 / SAE 2011-01-1996

Combustion Improvement of CNG Engines by Hydrogen Addition

Ryo Michikawauchi, Shiro Tanno, Yasushi Ito, Mutsumi Kanda, Masato Kawauchi, TOYOTA MOTOR CORPORATION

CM2: Combustion Diagnostics Part 1 of 2**(In-situ Measurement)**

Conference Rm. 3B

Chairpersons:

Nobuyuki Kawahara, Okayama University
Oivind Andersson, Lund University

9:30

JSAE 20119021 / SAE 2011-01-2045

Development of In-Cylinder Mixture and Flame Propagation Distribution Measurement Device with Spark Plug Type Sensor

Koshiro Kimura, Sachio Mori, Masato Kawauchi, Rio Shimizu, TOYOTA MOTOR

10:00

JSAE 20119238 / SAE 2011-01-2047

Simultaneous Measurements of Temperatures of Flame and Wall Surface in a Combustion Chamber of Diesel Engine

Hidenori Kosaka, Takuma Arai, Tokyo Institute of Technology

10:30

JSAE 20119164 / SAE 2011-01-2046

Transmission Electron Microscopy of Soot Particles Sampled Directly from a Biodiesel Spray Flame

Jean-Guillaume Nerva, Universidad Politécnica de Valencia; Teruo Yamaguchi, Hiroki Iguma, Hiroki Nishigai, Katsufumi Kondo, Satoshi Takano, Tetsuya Aizawa, University of Meiji; Caroline L. Genzale, Georgia Institute of Technology; Lyle M. Pickett, Sandia National Laboratories

11:00

JSAE 20119152 / SAE 2011-01-2051

Direct Sampling, TEM Analysis and Optical Measurement of Soot at Different Axial Locations in a Transient Spray Flame

Teruo Yamaguchi, Katsufumi Kondo, Hiroki Nishigai, Satoshi Takano, Tetsuya Aizawa, Meiji University

HC4: HCCI Combustion (Dual Fuel HCCI)

Conference Rm. 3A

Chairpersons:

Yasuhiro Urata, Honda R&D
Gen Shibata, HOKKAIDO UNIVERSITY

13:00 JSAE 20119336 / SAE 2011-01-1788

Spectroscopic Study of Two-Stage High Temperature Heat Release Behavior in a Supercharged HCCI Engine using Blended Fuels

Akira Iijima, Yujiro Tsutsumi, Koji Yoshida, Hideo Shoji, Nihon University

13:30 JSAE 20119118 / SAE 2011-01-1789

Combustion Process Modeling in HCCI Engine

Vyacheslav Gilimyanovich Kamaltdinov, South Ural State University

14:00 JSAE 20119252 / SAE 2011-01-1790

Effects of EGR and DME Injection Strategy in Hydrogen/DME Homogeneous Charge Compression Ignition Engine

Jeeyeon Jeon, Choongsik Bae, Korea Advanced Institute of Science and Technology

14:30 JSAE 20119288 / SAE 2011-01-1791

Improvement in DME-HCCI Combustion with Ethanol as a Low-temperature Oxidation Inhibitor

Hu Zhang, Ryo Hasegawa, Hideyuki Ogawa, HOKKAIDO UNIVERSITY

FD2-7: Alternative Fuels for CI Engines 7 (HVO and GTL Fuels 2)

Conference Rm. 3I+J

Chairpersons:

Takashi Kaneko, JX Nippon Oil & Energy Corporation
Hirohiko Hoshi, TOYOTA MOTOR

13:00 JSAE 20119289 / SAE 2011-01-1953

Performance of Diesel containing Bio-Hydrogenated Component

Rinaldo Caprotti, Infineum UK Ltd.; Nobuyuki Ishibe, Infineum Japan; Tristan Tang, Infineum Singapore; Inochanon Ratanavalee, PTT Public Company Ltd; Tipdecho Chonchada, PTT Public Company Ltd.; Supap Silapakampeerapap, PTT

13:30 JSAE 20119313 / SAE 2011-01-1954

Effects of Hydrotreated Vegetable Oil (HVO) as Renewable Diesel Fuel on Combustion and Exhaust Emissions in Diesel Engine

Kouseki Sugiyama, Isamu Goto, Koji Kitano, Kazuhisa Mogi, TOYOTA MOTOR CORPORATION; Markku Honkanen, Neste Oil

14:00 JSAE 20119322 / SAE 2011-01-1955

Emission Reduction Using Hydrotreated Vegetable Oil (HVO) with Miller Timing and EGR in Diesel Combustion

Kalle Lehto, Aalto University; Antti Elonheimo, Kari Häkkinen, Teemu Sarjoavaara, Martti Larmi, Aalto University School of Engineering

14:30 JSAE 20119327 / SAE 2011-01-1956

Large-Bore Compression-Ignition Engines: High NOx Reduction Achieved at Low Load with Hydro-Treated Vegetable Oil

Matteo Imperato, Aki Tilli, Teemu Sarjoavaara, Martti Larmi, Aalto University School of Engineering

FS3-2: Fuels for SI Engines: Gaseous Fuel Engine

Conference Rm. 3K

Chairpersons:

Thomas Wallner, Argonne National Laboratory
Kiyoshi Kawasaki, The University of Shiga Prefecture

13:00 JSAE 20119212 / SAE 2011-01-1998

LNG-Fuelled Engines and Fuel Systems for Medium-Speed Engines for Maritime Applications

Vilmar Aesoy, Norwegian University of Science and Technology; Per Magne Einang, Erik Hennie, Ingebrigt Valberg, Dag Stenersen, MARINTEK

13:30 JSAE 20119219 / SAE 2011-01-1999

Combustion Properties of Hydrogen/Air Mixture with and without Dilution

Yukihide Nagano, Tomohiro Takeo, Keiichiro Tomari, Akihiro Hayakawa, Toshiaki Kitagawa, Shoichi Kobayashi, Kyushu University

14:00 JSAE 20119234 / SAE 2011-01-2000

High Compression Ratio Engine Operation on Biomass Producer Gas

Jesper Ahrenfeldt, Ulrik Birk Henriksen, Risø DTU; Torben Kvist Jensen, DGC

14:30 JSAE 20119044 / SAE 2011-01-2001

Influence of Injection Strategy in a High-Efficiency Hydrogen Direct Injection Engine

Thomas Wallner, Nicholas S. Matthias, Riccardo Scarcelli, Argonne National Laboratory

CM2: Combustion Diagnostics Part 2 of 2

(Advanced Measurement System)

Conference Rm. 3B

Chairpersons:

Oivind Andersson, Lund University
Nobuyuki Kawahara, Okayama University

13:00 JSAE 20119103 / SAE 2011-01-2049

Laser-Induced Phosphorescence Measurements of Combustion Chamber Surface Temperature on a Single-Cylinder Diesel Engine

Julian Kashdan, Gilles Bruneaux, IFP

13:30 JSAE 20119137 / SAE 2011-01-2050

A New Generation of Optically Accessible Single Cylinder Engines for High-speed and High-load Combustion Analysis

Takayuki Fuyuto, Takafumi Matsumoto, Yoshiaki Hattori, Ko Kugimoto, Taketoshi Fujikawa, Kazuhiro Akihama, Toyota Central R&D Labs.; Hisaki Ito, TOYOTA MOTOR CORPORATION

14:00 JSAE 20119283 / SAE 2011-01-2052

Analysis of In-cylinder Flow and Fuel Vapor Concentration Distribution in Gasoline Direct Injection Engine

Rei Ishida, Tomohiro Nakayama, Makoto Kaneko, Koji Morikawa, Fuji Heavy Industries

DC3-3: Diesel Modeling 3

Seminar Rm. 2A+B

Chairpersons:

Efthimios G. Pariotis, Hellenic Naval Academy
Kazuhi Inagaki, Toyota Central R&D Laboratory

15:15 JSAE 20119262 / SAE 2011-01-1846

Study on Simple and High-Speed Diesel Combustion Model with Wall Impingement

Satoshi Sakaida, Yutaka Tabe, Takemi Chikahisa, HOKKAIDO UNIVERSITY

FD3-1: Gaseous Fuels for CI Engines

Conference Rm. 3A

Chairpersons:Takahiro Sako, Osaka Gas
Masao Okazaki, KUBOTA

15:15 JSAE 20119070 / SAE 2011-01-1962

Combustion Modes in a Diesel-CNG Dual Fuel Engine

Fredrik Königsson, AVL Sweden; Hans-Erik Ångström, Royal Institute of Technology; Per Stålhammar, AVL Sweden

15:45 JSAE 20119140 / SAE 2011-01-1963

Improvement of Performance and Reduction of Exhaust Emissions by Pilot-Fuel-Injection Control in a Lean-Burning Natural-Gas Dual-Fuel Engine

Takuji Ishiyama, Kyoto University; Jeongho Kang, Yutaka Ozawa, Graduate School of Energy Science, Kyoto University; Takahiro Sako, Osaka gas Co. Ltd.

16:15 JSAE 20119207 / SAE 2011-01-1964

Effects of Hydrogen Addition to Intake Mixture on Cyclic Variation of Diesel Engine

Toru Miyamoto, Hirokazu Hasegawa, Takashi Yagenji, Takehiko Seo, Masato Mikami, Yamaguchi university; Hajime Kabashima, Tomoyuki Hashimoto, Honda R&D Co., Ltd.

FD2-8: Alternative Fuels for CI Engines 8 (DME)

Conference Rm. 3I+J

Chairpersons:Mitsuru Konno, Ibaraki University
Mitsuharu Oguma, The National Institute of Advanced Industrial Science and Technology

15:15 JSAE 20119101 / SAE 2011-01-1958

Influence of Pilot Injection on Combustion Characteristics and Emissions in a DI Diesel Engine Fueled with Diesel and DME

Dong Won Jung, Jae Hoon Jeong, Ock Teack Lim, Ulsan University; Young Duck Pyo, Young Jae Lee, Korea Institute of Energy Research; Norimasa Iida, Keio University in Japan

15:45 JSAE 20119256 / SAE 2011-01-1959

Life Cycle Energy Use and GHG Emissions Assessment for DME from Coal

Xiaomin Xie, Zhen Huang, Shanghai Jiao Tong University

16:15 JSAE 20119276 / SAE 2011-01-1960

Utilization of Biofuels by a New Technique to Reduce NOx and Smoke Emissions in Diesel Engines

Masoud Iranmanesh, International Center for Science, High Technology and Environmental Sciences (ICST)

16:45 JSAE 20119314 / SAE 2011-01-1961

Study of DME Diesel Engine for Low NOx and CO2 Emission and Development of DME Truck for Commercial Use

Takashi Hara, Naoki Shimazaki, Naoki Yanagisawa, Takeshi Seto, Shigehisa Takase, Takeshi Tokumaru, Takuro Mita, Takeshi Okamoto, Isuzu Advanced Engineering Center; Yoshio Sato, National Traffic Safety and Environment Laboratory

FS3-3: Fuels for SI Engines: Hydrogen Engine

Conference Rm. 3K

Chairpersons:Kiyoshi Kawasaki, The University of Shiga Prefecture
Toru Nakazono, YANMAR

15:15 JSAE 20119076 / SAE 2011-01-2002

Optimization of Hydrogen Jet Configuration by Single Hole Nozzle and High Speed Laser Shadowgraphy in High Pressure Direct Injection Hydrogen Engines

Masakuni Oikawa, Yusuke Ogasawara, Yoshikazu Kondo, Kanan Sekine, Kaname Naganuma, Yasuo Takagi, Tokyo City University; Yoshio Sato, National Traffic Safety and Environment Laboratory

15:45 JSAE 20119144 / SAE 2011-01-2003

High-Pressure Hydrogen Jet and Combustion Characteristics in a Direct-Injection Hydrogen Engine

Mithun Kanti Roy, Nobuyuki Kawahara, Eiji Tomita, Takashi Fujitani, Okayama University

16:15 JSAE 20119166 / SAE 2011-01-2004

The Technical Implementation of a Retrofit Hydrogen PFI System on a Passenger Car

Pieter Huyskens, Mark Pecqueur, Stijn Van Oost, Pieter-Jan Goemaere, Kobe Bertels, Karel de Grote University College

16:45 JSAE 20119376 / SAE 2011-01-2005

Development of High Pressure H2 Gas Injectors, Capable of Injection at Large Injection Rate and High Response Using a Common-rail Type Actuating System for a 4-cylinder, 4.7-liter Total Displacement, Spark Ignition Hydrogen Engine

Kimitaka Yamane, Masakuni Oikawa, Mai Nogami, Yukio Umemura, Tokyo City University; Yoshio Sato, Yuichi Goto, National Traffic Safety and Environment Laboratory

CM1: Controls and Optimization

Conference Rm. 3B

Chairperson:

Yasuo Moriyoshi, Chiba University

15:15 JSAE 20119315 / SAE 2011-01-2066

Modeling of Diesel Engine Components for Model-Based Control (First Report) -The Construction and Validation of a Model of the Air Intake System -

Toshitaka Nakamura, Yasumasa Suzuki, Jin Kusaka, Masatoshi Ogawa, Harutoshi Ogai, WASEDA UNIVERSITY; Shigeki Nakayama, Takao Fukuma, TOYOTA MOTOR

15:45 JSAE 20119312 / SAE 2011-01-2044

Modeling of Diesel Engine Components for Model-Based Control (Second Report) -Prediction of Combustion with High Speed Calculation Diesel Combustion Model-

Yasumasa Suzuki, Jin Kusaka, Masatoshi Ogawa, Harutoshi Ogai, WASEDA UNIVERSITY; Shigeki Nakayama, Takao Fukuma, TOYOTA MOTOR