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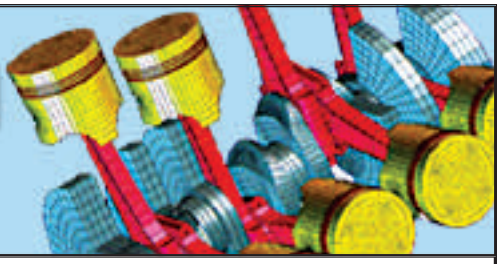
Internal Combustion Engine



Newsletter of the Internal Combustion Engine Division of ASME

Summer 2004

Chair's Message Greg F. Gutoski

"We Got A Good Thing Going"!

Within the ICE Division that is. I am your new chairman for the 7/04 – 7/05 year, and it is an honor and a privilege to serve the membership – I will do my best.

Most of the readers of this newsletter and this column already are familiar with the ICED mission statements, our purpose, the technical and administrative committee structure and our unique Associate member structure. It has been discussed and explained in every Chair's message for decades; I won't repeat it here.

This will not be a traditional column, as we are no longer the traditional ICE Division. In fact, we have maintained much of the traditional mode of operation for Divisional activities, but have also broken new ground in pushing the boundaries – a number of "first time" events have occurred recently and will continue in the future based on results observed thus far.

- The 2003 Spring Technical Conference was held in Salzburg, Austria – the first time an ICED conference was ever held outside of North America.
- A new modern membership brochure was developed in 2003 – the first time in decades that it has been updated.
- The new membership brochure was distributed to 25,000 readers of the Diesel & Gas Turbine Worldwide magazine in its April 2004 issue – a first for mass membership distribution.
- The 2004 Spring Technical Conference was held in conjunction with the

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SURI RAJAN ▪ Editor

2004 Fall Technical Conference to be held in Sunny Long Beach, CA Neil Blythe and Kirby Chapman

The theme for this year's Fall Technical Conference is *"I don't think we are in Kansas anymore, Toto!"* The Conference is hosted by Kansas State University in Long Beach, California. That's right … Kansas State University in Long Beach, California. Why would Kansas State University host a conference in Long Beach? Attendance at past conferences clearly shows that attendees place a relatively high value on the conference location. The number of papers received for this conference proves the point. Conference host, Dr. Kirby Chapman of Kansas State University, has teamed up with co-host Gregg Arney of Southern California Gas Company (SoCal).

Long Beach Shore Line and Skyline

The venue for this year's conference will be the Hilton Long Beach Hotel and Executive Meeting Center adjacent to the new world trade center and just a few minutes walk from the waterfront. Not only is this an excellent location, but the Technical Program is shaping up to be the strongest ever, with over 100 technical papers to be presented, a panel discussion on "Marine Port Emission" and an entire Track dedicated to the ARES and ARICE natural gas engine research programs. The ARES & ARICE Track will include 24 paper presentations representing some of the most advanced research in the world on the subject of natural gas fired reciprocating engines. In addition, the conference will be co-located with the ASME Tribology Division conference with opportunities to attend some of their sessions.

The Technical Program will begin Monday morning with the Keynote Address by Honda Lecturer, Joseph M. Colucci, Automotive Fuels Consulting, Inc. Mr. Colucci recently retired after an illustrious 36-year career with General Motors Research and Development Center

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Outgoing Chair's Message

Victor W. Wong

Knock, Knock. (I was there). "May I join you?" That was essentially what I asked at the door, as an innocent occasional conference attendee, at an ICED Executive Committee meeting that was in progress over a decade ago. They didn't let me in then, but a few years later they did. I rotated through various roles on the Executive Committee. As I reflect on the Division activities while I take up my new assignment as Past-Chair, two observations are clear: (i) Do volunteer and be active in the Division and ASME, and (ii) New volunteers are needed to take up new responsibilities all the time. During my several years on the ICED Executive Committee, I noticed that the Division and the ASME Society are open to ideas. Ideas are good, but people are needed to come up with the ideas and to turn the ideas into action. As a popular saying goes: "Just (volunteer and) Do It," if you are interested in any aspect of shaping and achieving the goals of this great organization of ours – the ICE Division or ASME in general.

ICED activities during the past year were very successful, in terms of attendance, technical content, and finances. A Joint Conference was held with the Rail Transportation Division in Erie, PA in September 2003 with about 180 attendees. As a supplemental (bonus) event, the Division also participated in the International Mechanical Engineering Congress and Exposition (IMECE) in November 2003 by sponsoring five technical sessions. The Division participated officially for the first time in CIMAC Congress 2004 in June in Kyoto, Japan, by having organized part of the technical program. In return, ASME-ICED was well recognized in the CIMAC Congress in all official protocols and events at the conference. We can build on this precedence in developing even greater synergies with CIMAC by collaborating in our respective future conferences.

More exciting events are still on the horizon. As the process of ASME's Continuity and Change develops, we will be starting with clean new planning sheets, and new opportunities will certainly develop, amid new challenges.

It was a great honor and pleasure to have served the ICE Division as Chair in the past year. I would like to thank the many wonderful individuals, volunteers and staff, with whom I have had the privilege to work in the various committees, Board of Associates, and in other ASME units. I look forward to continuing to work with this admirable dedicated group of friends and colleagues, in serving the interests of our members at large.

Division Sponsors Advanced Reciprocating Engine Systems (ARES) Workshop at 2003 IMECE in Washington DC

Victor W. Wong

Marks Enhanced Interactions among Academia, Industry, and Government

The Internal Combustion Engine Division joined forces with the US Department of Energy in presenting an ARES Workshop at the International Mechanical Engineering Congress (IMECE) that was held in Washington DC from November 15-21, 2003. DOE's Ron Fiskum opened the Workshop, which included five technical sessions that highlighted the ARES engine operating characteristics and cutting-edge pathways to improvements, exciting research in engine combustion and ignition, emission and after-treatment, friction and parasitic loss. Technical presentations were made by most of the universities in DOE's Advanced University Reciprocating Engine Program (AUREP). An Industry Panel Session provided the highlight of the Workshop, organized and moderated by Tim Callahan of Southwest Research Institute. In the Panel Session, industry experts discussed the technical challenges and industry-government-university alliances necessary to achieve efficiency goals that target 50 percent while meeting cost and emissions requirements. The panelists: Gordon Gerber of Caterpillar, Axel O. zur Loye of Cummins, and Ed Reinbold of Waukesha each focused on a different aspect of the R & D programs respectively: the economic and national energy benefits of gas engines and the regulatory requirements; the technical challenges and performance goals of the R & D efforts; and how industry interfaces with university research. The panel underscored the importance of the industry-university partnership.

Industry panel with DOE sponsor. From left: Gordon Gerber (Caterpillar), Ron Fiskum (DOE), Axel O. zur Loye (Cummins), Ed Reinbold (Waukesha).

Through this Workshop, the ASME Internal Combustion Engine Division and DOE brought together engineers, students, educators, administrators, customers and engine users in addressing the needs of the domestic gas-fired reciprocating engine industry. The 2004 Fall Technical Conference in Long Beach, CA, will feature a similar but expanded Gas-Fired Reciprocating Engine Symposium to include both research results from DOE's ARES Program and that from California Energy Commission's Advanced Reciprocating Internal Combustion Engine (ARICE) Program. We look forward to continued participation in ASME from this government-industry-university community.

Joseph M. Colucci to Present 2004 Honda Lecture

Karl J. Springer, Lecture Committee Chairman

Joe Colucci, *President of Automotive Fuels Consulting, Inc.*, is the 2004 Soichiro Honda Lecturer. The title of his lecture is:

Fuel Quality—An Essential Element in Vehicle Emissions Control

The lecture is scheduled for presentation on Monday, October 25, 2004, at the Division's Fall Technical Conference in Long Beach, CA.

Joe Colucci retired after an illustrious 36 year career with the General Motors Research and Development Center (formerly GMR). He joined the General Motors Research Laboratories in 1959 after receiving a BS ME from Michigan State University (1958) and an MS ME from California Institute of Technology (1959). When Mr. Colucci retired, he was Executive Director, Materials Research. Prior to that he had been Department Head, Fuels and Lubricants, a position he held for twenty years. During that period, he led General Motors' efforts to improve commercial fuel and lubricant quality for better fuel vehicle performance and reduced emissions. He led the campaign to obtain proper additives in gasoline to eliminate port-fuel injector deposits, developed the concept of reformulated gasoline, and led many programs to quantify its benefits.

He is a member of the National Academy of Engineering and is a Fellow of the SAE. He has served with distinction on many SAE Fuels and Lubricants technical and standards activities while authoring and presenting numerous technical papers on automotive fuels and lubricants. He has twice received the Octane Week Executive of the Year Award: in 1991for his leadership in

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Joeseph M, Colucci

The GOAL of Emissions Regulations for Large Engines

Stephen G. Dexter and Thomas Bouché, AVL List GmbH, Austria

THE FIRST ENGINE EMISSIONS

100 years ago one of the largest ships had engines producing 45,000 hp. It took 215 men working in three shifts to shovel the 620 tons of coal per day needed to power the engines. The exhaust emissions could clearly be seen. That same year, in 1903, the world's first diesel ship was launched in Russia. From that moment diesel propulsion steadily gained acceptance but still the public associated diesel engines with emissions. At first these were smoke and particulates but in the last 30 years NOx and other gases have received attention. Emissions regulations have been introduced to limit emissions from all types of diesel engines and this raises the question of what will be the end result and what is the likely goal.

EMISSIONS REGULATIONS

Road vehicles

The first wide-spread regulations for diesel engines were those applied to road vehicles. For 30 years levels have been reduced. Figure 1 shows the current levels which are enforced or are proposed in the USA, Japan and Europe for heavy duty road vehicles. The zero emissions engine has not yet been proposed but the zero emissions impact engine might be considered by some authorities in particularly sensitive areas.

Stationary engines

At the time road vehicle regulations were being introduced, limits were applied to stationary engines by local authorities in the USA, Europe and Australia by application of existing Clean Air Acts. Since then most authorities have introduced more specific regulations but some are extremely severe as shown in Figure 2. There is still a huge number of different regulations applied not only at national, but also at local level.

Marine engines

There are about 95,000 ocean going vessels in the world today. The International Maritime Organization (IMO) recently reached agreement on regulations for NOx levels as shown in Figure 3. SOx levels are also controlled. These regulations will be enforced in 2005 but will apply to all engines in ships built after January 2000. The IMO aim is to introduce a lower level at a later date but it seems unlikely that this will be in 2005 as originally intended.

In 1999 the United States EPA adopted Tier 2 emission standards for new marine engines to go into effect in 2004. Figure 4 shows the levels applied to Category II engines between 5 and 30 litres per cylinder. For Category III engines, above 30 litres per cylinder, the EPA currently requires them to comply with

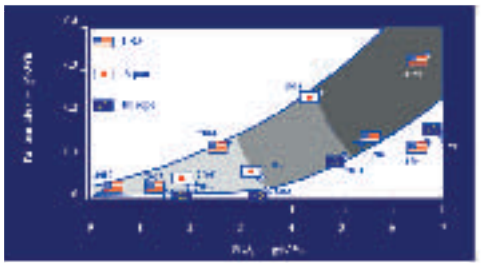


Figure 1 – World-wide Trend in Emissions Legislation for Heavy Duty Diesel Engines

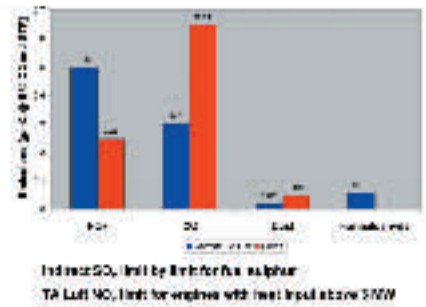


Figure 2 – German and Swiss Standards for Stationary Diesel Engines

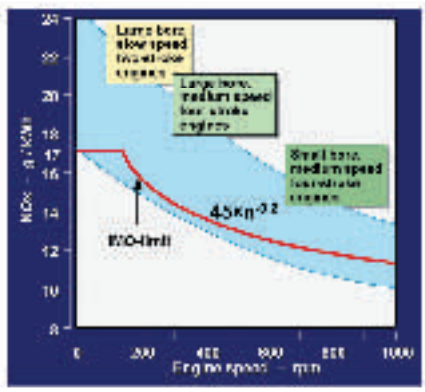


Figure 3 – Emission Regulations for Marine Engines: MARPOL 73/78 Annex VI

IMO regulations (Tier 1). Up to now there is no Tier 2 standard for Category III engines. The standards currently under discussion for this engine category are shown in Figure 5 .

European authorities currently accept the IMO regulations but, if by the end of 2006 no tighter limits are set by IMO than those in the current annex VI, then the EU will propose NOx limits in line with the US EPA Tier 2.

The only other limits to marine emissions are those applied in certain inland waterways. However, there are financial incentives to reduce emissions by schemes introduced in Norway and Sweden though these do not come under the heading of regulations.

Locomotive engines

The US EPA has already introduced emissions regulations for locomotive engines. Tier 1, introduced in 2002, and the more strict Tier 2, to be introduced in 2005, are shown in Figure 6.

The international union of railways (UIC), has also agreed and published emissions regulations for locomotives. These are shown in Figure 7. These are not a legal requirement but are used when purchasing locomotives so they have the same effect as regulations.

Comparison between EPA and UIC levels is not possible but Tier 2 EPA levels are very severe and will only just be met by engines using existing technology without water injection, after-treatment or a severe loss in efficiency.

ENFORCEMENT

Enforcement can be done in one of four ways:

- Certification and spot checks
- Continuous measurement
- Certification and technical file
- On-board diagnostics

Certification and spot checks are proposed by the EPA for locomotive engines and stationary engines. Spot checks are expensive and open to abuse. Because of these difficulties the EPA is envisaging the use of continuous measurement for marine engines. The technology is not yet available to make this a really practical proposition for a locomotive or a small marine engine or generator.

The technical file proposed by the IMO is a detailed recorded list of features of the engine which affect exhaust emissions and which were fitted when it carried out its type test. If a change has to be made, the engine user must show, by laboratory or on-board testing if necessary, that the emissions have not increased. It is common practice to accept retrofit where a modified component can be installed in the place of an existing component. Also engine users install spare parts which are not approved by the engine builder. The engine builders would be delighted to stamp out this practice but this may prove impossible. It is not clear how the approving body can handle this situation. It is anticipated that there will be severe problems.

The concept of On-Board Diagnostics (OBD) is to carry out a certification test and, at the same time, to measure engine parameters which will affect emissions. Some of these other parameters are then measured on a continuous or semi-continuous basis and recordings can be periodically or continuously examined and the change of emissions levels can be inferred. OBD has been introduced into the USA and, since 2000, into Europe for road vehicles as shown in Figure 8. The technology is clearly available for the larger engines and we propose that this eventually will be the method used to enforce emissions regulations in marine, stationary and locomotive engines. The technology is available now but it is likely to take many more years before a common standard is agreed to. It is more likely to be first applied by individual countries for stationary or locomotive engines.

NO_x AND PARTICULATE FORMATION

It is important to remember the mechanism of emissions formation which is shown in Figure 9. As the evaporated fuel on the left hand side of the diagram gradually mixes with air, the temperature rises and combustion starts. During this period soot is formed, most of which will be oxidized before the end of the cycle. Less soot is emitted at higher temperatures and when more air is present. When higher temperatures are reached and excess oxygen is available, then NO_x is formed. The higher the temperature and longer the time in contact with air, the higher the NO_x level. During this period at high temperature with excess air available, more and more of the soot is oxidized so that the particulate level at the end of the cycle is reduced. This effect of increased temperature causing an increased NO_x but a reduction in particulates explains why both these variables have to be considered when any change to the engine operating parameters is made.

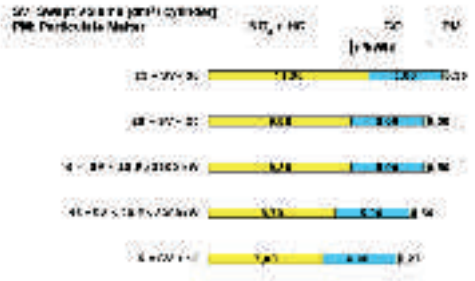


Figure 4 – Tier 2 Emission Limits in USA for Category II Marine Engines

Proposals for NO_x: Approximately 20 % reduction

Speed Range [rpm]	Current TIER 1 [g/kWh]	Proposed Tier 2 [g/kWh]
n < 130	17	13.3
130 ≤ n < 2000	45·n^-0.2	31.5·n^-0.2 + 1.4
n ≥ 2000	9.8	31.5·n^-0.2 + 1.4

Proposals for CO: 3 g/kWh

Proposals for HC: 0.4 g/kWh

No Proposals for Particulates

Figure 5 – Proposed Tier 2 Emission Limits in USA for Category III Marine Engines

Validity		NOx	CO	HC	PM
2002 through 2004 (TIER 1)		9.9	3.0	0.74	0.6
		14.3	2.4	1.0	0.72
2005 and later (TIER 2)		7.4	2.0	0.4	0.27
		10.3	3.2	0.5	0.32

Figure 6 – US Locomotive Emissions Regulations

Validity		NOx	CO	HC	PM
Part 2000		8.0	2.5	0.6	
		8.5			0.25
		9.9	3.0	0.8	
		4.5			0.15
		6.0	2.0	0.5	0.20

Figure 7 – UIC Locomotive Emissions Regulations

Figure 8 – European On Board Diagnostics (E-OBD) Time Schedule

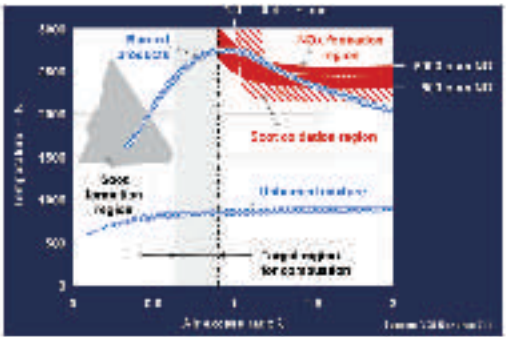


Figure 9 – Status of Mixture, Burned Products and Formation Regions in Diesel Combustion

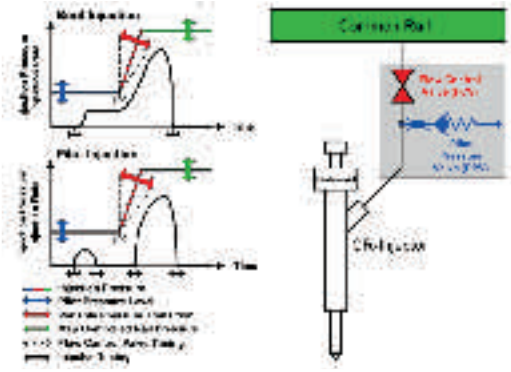


Figure 10 – Pressure Modulated Common Rail Injection Concept

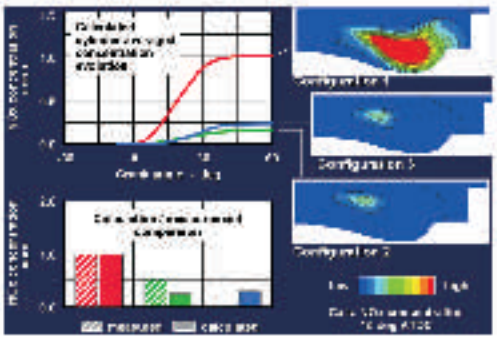


Figure 11 – NOx Concentration Calculation of Three Piston Bowl Configurations – Full Load

Figure 12 – Aftertreatment Systems

EMISSIONS REDUCTION

Retard and Optimized Compression Ratio

As a first step compression ratio and timing are optimized to reduce NO_x without a fuel consumption penalty or exceeding the firing pressure limit.

Fuel injection

Common rail fuel injection systems are being introduced by many engine builders to improve flexibility, particularly at lower engine speed. Figure 10 shows how it can be used to introduce pilot injection or a reduced initial injection rate to reduce the NO_x formed during premixed combustion (boot injection). Post injection helps to burn off remaining particulates. CFD is used to study NO_x formation and reduction methods as shown in Figure 11.

Exhaust gas recirculation (EGR)

EGR reduces NO_x by replacing some of the oxygen in the cylinder by nitrogen and CO_2 to control maximum temperatures. It is used effectively in small engines where the exhaust pressure is often higher than the intake pressure. With large engines it is necessary to use energy to recompress the gas to recirculate it. Most large engines operate on higher sulphur level fuels or heavy fuel oil. Exhaust not only has to be cooled and recompressed but also filtered to avoid corrosion and abrasive wear. This makes EGR unattractive but internal EGR is being used to some extent as with AVL's system "TINER".

Water

Introducing water to the engine is very effective in reducing emissions. It can be direct injected, as an emulsion with the fuel, or by humidifying the intake air. All three methods are used. The Humid Air Motor (HAM) can be operated on untreated sea water but water consumption is some three times the fuel consumption so it is impractical for locomotives.

Aftertreatment

The most effective aftertreatment system today is the Selective Catalytic Reduction (SCR) system. Other aftertreatment systems are being developed and several show potential as shown in Figure 12. However, many of them cannot tolerate sulphur in the exhaust which has led to low sulphur fuels being introduced as shown in Figure 13. The much lower cost of high sulphur fuels used in marine and many stationary engines restricts the choice of aftertreatment systems.

Summary of reduction methods

Figure 14 shows a simplified summary of how the various reduction methods compare when used with an engine which is optimized for best performance. This should only be used as a guide. It is predicted that, for cost and durability reasons, emissions regulations will stop far short of the levels possible with current technology. As technology develops so will the levels reduce but, if it becomes uneconomic to meet a regulation, the user will find an alternative power source.

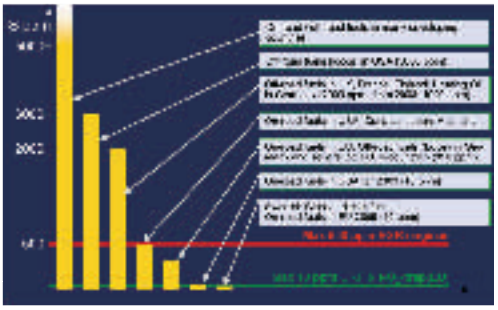


Figure 13 – Sulphur in Diesel Fuel and Heating Oil in On Road and Off-Road Applications

Approach	% NO_x Reduction	Comments
In-cylinder measures	30	
Exhaust gas recirculation	20	Sulphur Durability
Water	30-75	Consistency
Aftertreatment	90	Cost

Figure 14 – Technologies to Control Emissions

THE LIKELY GOAL OF REGULATIONS

Already emissions regulations have caused changes to diesel engine design and have caused many diesel engines to be replaced by gas engines. Technology is progressing so it can be foreseen that the zero impact emissions engine could be feasible in the future. This will carry large cost and efficiency penalties. Where the effect of emissions is critical regulations may demand the use of zero impact emissions engines. The authors predict that in rural areas, for locomotive engines and for engines at sea such a restriction will never be required because of the cost. We predicted that the regulations covering large engines will follow those for the automotive engines but they will follow, rather than lead, available technology to steadily reducing levels.

The goal of emissions regulations will be to improve air quality to a level accepted by the people affected but without reaching a level which imposes severe economical restraints. Only in areas of extreme poverty or extreme wealth will there not be a balance between air quality and economics. The indications are that for global regulations, such as for marine engines, sound judgement will prevail.

Condensed from Paper ICEF2003-773 presented at ASME Internal Combustion Engine Division and Rail Transportation Division 2003 Fall Technical Conference September 7-10, 2003, Erie, Pennsylvania.

Fall 2003 Erie, Pennsylvania Technical Conference Highlights

Neil Blythe

The 2003 Internal Combustion Engine Division (ICED) Fall Technical Conference was a joint conference with the Rail Transportation Division of ASME and attended by over 180 participants. It was held in Erie, Pennsylvania, September 7 – 10 at the Courtyard Marriott Conference Center and co-hosted by GE Transportation Systems and Gannon University.

The conference was kicked off with a Keynote Address by Honda Lecturer, Wallace R. Wade, Chief Engineer, Ford Motor Company, titled "***Near Zero Emission Internal Combustion Engines***". Mr. Wade delineated an integrated approach to total vehicle design necessary to achieve further emission reductions in a platform that has already demonstrated substantial emission reductions, primarily through combustion improvements and exhaust after treatment up to now. The presentation identified the challenges and opportunities in the on going pursuit to minimize the impact of transportation on the environment.

The keynote address was followed by two days of technical sessions, in which over 40 papers were presented in three concurrent sessions. Topics included Basic Engine Design, Gas Engines and Alternative Fuels, Sensors and Controls, Lubrication and Friction, Micro-pilot Ignition in Gas Engines, and Spray Combustion and Emissions. The Rail Transportation Division sponsored a panel discussion on the "Impact of Emissions Restrictions – Opportunities" relative to the Rail Transportation Industry. Panel participants included Steve Fritz, Southwest Research Institute, Paul Flynn, GE Transportation Systems, Brian Smith, Transportation Technology Center, Inc., and Frank Stodolsky, Argonne National Laboratory.

As usual, the conference included very enjoyable and interesting evening programs and tours. On Monday evening, GE Transportation Systems hosted a dinner at the GE Learning Center and guided tour of the Locomotive Assembly and Test Facility. On Tuesday evening, the annual ASME-ICED awards banquet was held at the historic Union Station; a restored passenger rail station that has been converted into a fine restaurant and brewpub.

On Wednesday morning, the conference was concluded with a tour of the GE Diesel Engine Plant in Grove City, PA. After a brief reception and introduction, attendees toured the state of the art locomotive engine manufacturing facility where GE produces and tests the FDL and the new GEVO engines.

Special thanks go out to Paul Flynn of GE Transportation Systems and Gong Chen of Gannon University for hosting this very successful conference and to the many sponsors who continually support ICED conferences. If you are interested in sponsoring or hosting a future conference, please contact Andy Pope, A&A Enterprises at (814) 757-8201 or email him at apope@westpa.net.

New Board of Associates Members

The ICE Division welcomes the following members to the Board of Associates.

Dr. Clark Midkiff
University of Alabama, Tuscaloosa, Alabama

Dr. Hakan Serhad Soyhan
University of Sakarya, Esentepe Campus, Sakarya, Turkey

Mr. Jacques van Oppen
Heinzmann America, Inc, Wellington, Colorado

The Board of Associates is healthy and growing.

Colucci – continued from page three

the development of reformulated gasoline, and in 1995 for his leadership in improving automotive fuel quality and reducing vehicle emissions. In 2001, he received the SAE's Edward N, Cole Award for automotive Engineering Innovation. In 2003, he received the Michigan State College of Engineering's Claude R. Dickerson Distinguished Alumnus award and the University's Distinguished Alumnus Award.

This lecture will be the 18th in a series of Honda Lectures established by ASME in 1986 *to recognize achievement or significant contributions in the field of personal transportation.* It promises to continue the long tradition of excellent lectures by eminently qualified experts in the field.

Ramesh Poola

Executive Committee Inducts Ramesh Poola

Ramesh Poola, the incoming Executive Committee member, is employed as a Senior Project Engineer at the Electro-Motive Division of General Motors Corporation, LaGrange, Illinois since May 2000. He is the Engine Module Leader for EMD's 4-cycle H-engine. His responsibilities include research and development of emissions reduction technologies for EMD diesel engines to comply with EPA and UIC standards. He is also the Program Manager in charge of collaborative research between EMD and US Department of Energy on R&D for Locomotive Emissions Reduction and Efficiency Improvements. Before joining EMD, he was with Argonne National Laboratory for six years where he was involved in several engine and vehicle research projects for the U.S. Department of Energy, Office of Transportation Technologies.

Dr. Poola received his Ph.D. from the Indian Institute of Technology, Madras, India in 1993 where he developed emissions reduction devices for two-cycle gasoline engines. His Master's work at Anna University involved computational studies of turbocharged truck diesel engines and turbocharger matching. He is currently working towards his MBA at the University of Chicago.

Dr. Poola, who has published widely and holds a number of patents, is recognized both in industry and in academia; he is the recipient of many awards, including an R&D 100 award, Discover Magazine's Finalist, Argonne National Laboratory Director's award and two Pace Setter awards. He has been an active member of ASME-ICED since 1994. He has led numerous committee assignments with ICED that include maintaining a reviewer's database, organizing technical sessions, supporting the Technical Papers Committee, co-organizing Fuels and Combustion technical sessions, and reviewing technical papers.

24th CIMAC WORLD CONGRESS...Another First for ICED

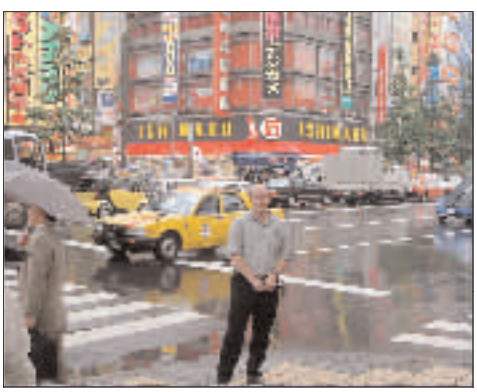
Greg Gutoski, Chair, CIMAC U.S. National Committee

This year's Spring Technical Conference was held jointly with the 24th CIMAC World Congress in Kyoto, Japan on June 7-11, 2004. The CIMAC Congress is an event, not unlike our own ASME ICE Division conferences, where professionals gather, both technically and socially, to share views and find solutions to technical, commercial and market problems. The aim of both forums is to strengthen the internal combustion engine business by using the organizations as a platform for collaboration with industry. One difference between our two groups is the timetable for conferences; the CIMAC Congress is held every 3 years, whereas ASME-ICE conferences are held twice per year.

ICED Chair Victor Wong Addresses CIMAC Attendees at Opening Ceremony in Kyoto.

L to R: Victor Wong, Matti Kleimola and Greg Gutoski with Nikolaos Kyrtatos at CIMAC Conference.

This year's Congress was attended by over 800 delegates, 110 accompanying persons, and 45 exhibitors, including a high level of U.S. participation and ASME-ICED members. The "press" was also represented by 4 industry publications, including our own Diesel & Gas Turbine Worldwide magazine from the U.S. The technical program focused on diesel engines, gas engines and gas turbines, their components and systems, and covered marine, stationary and rail applications with a special emphasis on the role of engine users. Topics covered through 185 technical papers, 20 poster sessions, and 3 panel discussions included product development, fundamental engineering, user aspects and environmental issues.



Exploring Kyoto

The Kyoto Congress marked the first time ever that the ICE Division has conducted its conference jointly with a CIMAC Congress by hosting 4 technical sessions and 16 technical papers. Our Chairman, Victor Wong, joined the other CIMAC leaders and dignitaries in giving an introductory speech during the opening ceremony, as well as participating in the closing event at the banquet on Thursday evening. The ICED membership was well represented in Kyoto, and the CIMAC organization was highly complimentary of our involvement.

The excellent technical sessions covered a broad range of topics including slow speed, medium speed & high speed engines, gas engines, gas turbines, fuel cells, turbochargers, engine components, fuel injection systems, tribology, noise & vibration and simulation techniques.

The social events were as equally enjoyed as the technical program. A welcoming reception was held on Monday night in the gardens of the Congress

A Sample of the Cultural Events at Kyoto Conference.

site, the Kyoto Convention Center, which concluded with fireworks as the climactic event. The traditional and ever-popular "ABB Evening", hosted by ABB Turbo Systems Ltd. Switzerland, was another smashing extravaganza and was held at the Umekoji Steam Locomotive Museum. Spouses' programs were available during the Congress that gave a flair of the traditional Japanese culture, ceremonies, temples and Kyoto countryside. Post Congress tours were also available to diesel, gas turbine and crankshaft facilities. The culminating event was the banquet where the "torch" was passed from outgoing CIMAC President Prof. Nikolaos Kyrtatos to incoming President, Prof. Matti Kleimola. Prof. Kyrtatos is to be commended for leading

Visit to Locomotive Museum.

CIMAC activities for the last 3 years, and congratulations and good luck are extended to Prof. Kleimola for residing in the top CIMAC chair for the next 3 years.

The next CIMAC Congress will be held in Vienna, Austria in 2007 and is bound to be another excellent occasion. I will keep you informed of the next Congress, as well as other CIMAC events, activities and opportunities for involvement, as the planning process unfolds.

ICED Awards Winners

A highlight of the Fall 2003 ICED conference held in Erie, Pennsylvania was the awards presentation presided over by Chairman Victor Wong with Abnash Narula overseeing the award presentation. Dr. Hamid Torab of Gannon University welcomed the attendees and Greg Gutoski served as toastmaster for the gathering. The following awards were presented:

(Photo not Available)
Laurent Chambard
ICE Division Speaker Award

Wallace R. Wade
Recognition of Receiving the 2003 Soichiro Honda Lecturer Award

John Smythe
ICE Division Speaker Award

John C. Hedrick
ICE Division Meritorious Service Award

Steve G. Fritz
ASME Retiring Chairman Certificate

Kirby S. Chapman
ICE Division Meritorious Service Award

Karl J. Springer
Honorary Member Award, 2003

David P. Schmidt
ICE Division Speaker Award

Jerald A. Caton
Richard S. Woodbury Award

Rodica Baranescu
ASME Internal Combustion Award

2004 Tech – continued from page one

(formerly the General Motors Research Laboratories). His presentation, titled "**Fuel Quality – An Essential Element In Vehicle Emission Control**," will review the three significant changes in fuel chemistry that have enabled vast reductions in automotive emission over the past 40 years. This lecture is the 18th in a series of Soichiro Honda Lectures established by ASME in 1986 to recognize achievement or significant contributions in the field of personal transportation. It continues the long tradition of excellent lectures by eminently qualified experts in the field.

Following the Keynote Address, the Technical Program will continue through Tuesday afternoon with five (5) concurrent sessions. Session Topics include Advanced Materials, Emissions, Fuel Sprays, Combustion, Engine Modeling, Marine Engine Design for Low Emissions, Basic Engine Design, Lubrication & Friction, and the ARES-ARICE Symposium on Gas-Fired Reciprocating Engines.

As in the past, the Associates Meeting will be held on Monday afternoon, from 4:30 to 6:00 pm, strategically scheduled so as not to interfere with technical programs or evening opportunities in beautiful southern California. The purpose of the Associates Meeting is to inform ASME-ICED Associates and conference attendees of the most recent and future division activities. All conference attendees are encouraged to attend and participate.

Evening programs will be limited to the **Annual Awards** Banquet on Tuesday evening. The banquet will be held in the newly-restored Verandah Grill onboard the historic **Queen Mary,** which is located on the water a few blocks away from the conference. The Verandah Grill was once the night club for the ship's elite, with beautiful hand-painted murals, a sunken dance floor and doors opening onto the Sun Deck. Be sure to register early for the banquet as capacity is limited. Monday evening will include a joint reception with the Tribology Division in the conference hotel

A new feature of this year's conference will be "Table Top" exhibits. Several companies will showcase their latest technology in engine equipment. If you are interested in participating with an exhibit, please contact Serena Zilberstein at 212-591-7856 or visit the conference website at www.asmeconferences.org/icef04.

Continuing with past practice, the attendees will tour the engine upgrade activities at the Orange County Sanitation District. This facility houses several large-bore engines that have received a variety of emission upgrades throughout the years. Two engines are currently undergoing upgrades with new ignition systems, re-worked turbochargers, and a variety of other items. These particular upgrades are being completed by a consortium that includes Advanced Engine Technology Corporation in Oakland, Turbine Specialties Inc., from Salina, Kansas, and Kansas State University's National Gas Machinery Laboratory. Greg Beshouri, president of AETC, will be onsite to describe the upgrade process, chronicle the strategic planning that was involved, and describe the impact of the specific technologies. Attendees will be able to view a plethora of upgrade technologies that have played a key role in helping the District meet the stringent Southern California emissions requirements.

A block of rooms have been reserved for conference attendees at a special rate, but make your reservations early as this promises to one of the best attended conferences ever. Details can be found on the conference website at www.asmeconferences.org/icef04. And while the conference officially gets underway Monday morning with the Keynote Address, please join us for refreshments at the Early Bird Reception on Sunday at 6:00 pm in the Hilton Hotel. For additional information or to register visit: https://www.asmeconferences.org/ICEF04/.

See you there!

Teoman Uzkan Honored with ASME Dedicated Service Award

Stephen Fritz Presents Teoman Uzkan with ASME Dedicated Service Award.

Culminating over 20 years of membership and meritorious contributions to ICE Division and to ASME in general, Dr. Teoman Uzkan has been honored with the ASME Dedicated Service Award. The ASME Dedicated Service Award honors "unusual dedicated voluntary service to the Society marked by outstanding performance, demonstrated effective leadership, prolonged and committed service, devotion, enthusiasm and faithfulness". Dr. Uzkan has a distinguished engineering career that has spanned over 35 years with General Electric, the Turkish Navy, Bogazici University, International Harvester and General Motors, Electromotive Division. He has made lasting contributions to the mechanical engineering profession by introducing modern analytical techniques to support new product development, by pioneering the use of the right combination of analysis, small scale testing and full size testing to improve design and reduce costs. He holds a number of patents.

Dr. Uzkan has generously contributed his time to a broad range of service and education activities within the engineering community. He has been serving as ambassador to link academic, industrial and government groups together. He has taught at Stanford University for two years, at the Turkish Naval Academy for three years, and at the Bogazici University of Istanbul for four years. He has been enthusiastically introducing, mentoring, advising and supporting engine researchers at Universities and National Laboratories to participate in new technology development that would ensure the relevance of academic and government research.

Dr. Uzkan's service, especially to the ICE Division has been exemplary. In addition to organizing numerous technical sessions, he served as a member of the Executive Committee of the ICE Division for 7 years (1995-2001), and Chairman of the Internal Combustion Engine Division during 1999-2000. He was the ASME ICE Divisional Representative to the CIMAC Diesel Technical Committee for 6 years and a member of the Government Relations Committee of the ICE Division for 4 years. Congratulations to Dr. Uzkan on yet another achievement.

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prestigious CIMAC Congress in Kyoto, Japan – the first joint conference with CIMAC.
- Table-top exhibits were incorporated at the 2004 Fall Technical Conference in Long Beach – not a new idea, but a re-established initiative to boost new attendees.

These "firsts" have not been accidental; they were planned changes by the Executive Committee and Associate membership using some foresight and experimentation through Long Range Planning (LRP). The LRP committee meetings in recent years have focused on improvements in the Division's core strengths – the biannual Technical Conferences. Some issues discussed and questions explored during these LRP meetings included:
- How can we maintain or boost conference interest, participation and attendance?
- How do we spread the good word about our Divisional activities and conferences?
- How do we increase our base and Associate membership?
- How do we support two conferences per year with dwindling conference "hosts" and without overburdening Associate resources while maintaining a low cost conference?

The net result was the implementation of the "firsts" mentioned above, and the development of a conference model that spans a 3 year, cycle which includes:
1. Three traditional U.S./Canada based conferences to be held at a host company/organization in the Fall of each year, including the annual awards banquet.
2. One Spring conference to be held jointly with the CIMAC World Congress with ICED conducting 4-5 sessions of 16-20 papers.
3. One Spring Conference to be held in conjunction with a larger U.S. based conference where ICE brings its full technical content, but no local arrangements duties.
4. One off-shore Spring Conference, where ICE would handle the full technical content and handle local arrangements or delegate it to ASME staff.

It is believed that this model meets Divisional objectives and expands ICED's exposure to its worldwide membership and promotes interest, attendance and new membership from a worldwide engine industrial community.

It seems to be working. A typical ICED conference contains 40-60 technical papers in 3 concurrent sessions. For the upcoming 2004 Fall Technical Conference in Long Beach, there will be almost 100 papers in 5 concurrent sessions. We Got A Good Thing Going!

How can we improve on a good thing? My belief is that we need to maintain and reinforce conference participation and attendance from the entire ICED membership including Universities, National Labs, Engine Consulting Firms, Engine Suppliers, Engine Manufacturers, Engine Customers and Engine End Users. There is also a need within ICE to bolster the participation of end users, engine customers, and even engine manufacturers. This has also been discussed at LRP meetings and action taken has been moderately successful. The 2002 STC in New Orleans was co-hosted by Avondale Industries, a major U.S. Shipyard utilizing large bore diesel engines, and the 2001 STC was hosted in Philadelphia by the U.S. Navy, one of the largest End Users of high speed and medium speed diesel engines. To help bolster further End User and Customer involvement, the 2005 ICE STC will be held in conjunction with the new "ASME Power" conference that combines much of ASME's power industry groups, including ICE and International Joint Power Generation Conference (IJPGC), and will be co-located with the much larger "Electric Power Conference & Exhibition" in Chicago on April 5-7. This kind of involvement by end users and manufacturers keeps the Division thriving.

A final topic that needs to be addressed is the "Continuity and Change" initiatives going on with the broader ASME organization. ASME is in the implementation phase (Phase II) of a major restructuring of its technical divisions. Phase II of the Continuity and Change Transition is a 15 month period, March 2004 – July 2005, designed to maximize member and staff participation in ASME's transition to the Board-approved model through project teams that are planning the transition. The ICED is currently a part of the Energy Conversion Group (ECG) along with 3 other divisions, Power, Nuclear and Fuels & Combustion. One proposal on the table, among other options, is for the ECG to join with the 3 divisions of the Energy Resources Group, Solar, Advanced Energy Systems, and the Ocean, Offshore and Arctic Engineering group to form an Energy Institute. The aim is to combine similar divisions with common interests into a larger entity to better meet the technical, membership and financial objectives of ASME. The impact on the ICED, if any, will be evaluated and communicated as the plan and implementation period further unfold. To keep abreast of the latest news visit the "Continuity and Change" website at: www.asme.org/change/

In conclusion, I ask that you all participate in our Divisional activities in any way that best matches your capabilities. Visit the ICED website at www.asme.org/division/ice/

The ICE Division is a wonderful opportunity and blend of technical professionalism, social enjoyment and a family-like environment. Come join the fun – We Got a Good Thing Going!

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CALL FOR PAPERS

Internal Combustion Engine Division of ASME
2005 Spring Technical Conference
April 5 – 7, 2005, Chicago, IL, USA

The 2005 Spring Technical Conference will be held at McCormick Place in Chicago, IL, USA. The STC will be held in conjunction with the ASME Power Conference. This venue focuses on distributed energy systems, and will include an extremely large trade show. Papers are invited for publication and presentation on topics specifically related to engines used for back-up or standby power generation, distributed electrical production systems, and other related engine topics pertaining to power generation. The accepted papers will address any aspect of the design, development or application of compression-ignition (diesel), spark ignition, rotary or reciprocating engines.

Attendees will be able to participate in a variety of rich Energy Conference activities that include exchanging information with exhibitors at the trade show and attending other technical sessions.

Anticipated technical sessions span the range from fundamental research to practical in-use applications. Examples of topics include, but are not limited to, combustion, noise and vibration, engine-fuel interactions, in-cylinder emission control and flow processes, exhaust after-treatment, alternative fuels, engine cooling, lubrication, fuel injection and ignition systems, engine design, control and monitoring, engine monitoring and diagnostics, advanced engine concepts, component dynamics, wear, and materials.

All papers presented at the conference will be published in the Conference Proceedings and available at the conference. Papers will be considered for the Journal of Engineering for Gas Turbines and Power. Exceptional written papers and presentations will be considered for ASME IC Engine Division Conference awards. ASME review and publication policies will apply. No presentations will be accepted without a written and approved paper and no paper will be published without being presented.

All abstracts and offers for papers must be submitted via the conference website (www.asmeconferences.org/ices05). Other information can be obtained by contacting the Technical Program Chairman and Proceedings Editor:

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Important Dates

October 4, 2004	Offer of Paper, One Page Abstract
November 22, 2004	Draft Manuscript Due for Review
January 17, 2005	Camera Ready Paper Due