



SNAME NTUA

December 19, 2013

Vol. 2, Issue 1

www.sname.org/NTUA

UPCOMING EVENTS

• • 16 January Student Meeting

13:30, NTUA Library,
Multimedia
Auditorium

*"Recruitment
Meeting"*

*Speaker: Prof.
Apostolos
Papanikolaou, Mr
Petros Lalangas*

• • 23 January Technical Meeting

19.00, Auditorium
Maran Tankers, 354
Syngrou Ave.,
Kallithea

*"NTUA Thesis
Presentations"*

NEWSLETTER STAFF

Michael Foteinos,
Section Chair

Konstantina Stamou
Section Vice-chair

Ilias Soultanias,
Section Secretary
Treasurer

Significant Presence of the Greek Student Section in 2013 Annual Meeting of SNAME

by Michael Foteinos,
Konstantina Stamou, Ilias
Soultanias, Efstathios Karlis,
Georgios Dafermos, Evangelos
Loukatos

With the gracious help from the Greek Section and its sponsors, SNAME NTUA, was able to partially fund 5 students to attend the Annual Meeting in Bellevue, Washington this year. The attendees were, Michael Foteinos (Student Section's Chairman), Ilias Soultanias (Secretary/Treasurer, and the student members Efstathios Karlis, Georgios Dafermos and Evangelos Loukatos.

Technical Presentations and Industry Expo

The Greek delegation departed from Athens at November, 4th, 2013 and the following day, we all volunteered in the preparations of the Annual Meeting which was greatly appreciated by all SNAME



Representing (Above) Prof. Papanikolaou together with the 5 NTUA Student Members. . (Below right) all 5 NTUA Student members.

Officers. The volunteering work from our Section did not stop there, as all five delegates also served as Assistant Presiding Officers in papers presented at the conference, some of us more than once.

Students had the opportunity to explore a large industry Expo where they met professionals and got informed about innovative



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Open Air Reunion Meeting

by Stamou Konstantina

On Saturday, October 5th, 2013, the SNAME NTUA Student Section carried out an Open Air Reunion Meeting at Antonis Tritsis Park.

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SNAME Snapshots (Top left) NTUA Student Members performed a capella at the Annual Banquet. Photo courtesy of sname.org. (Top right) Executive Committee of NTUA Student Section was awarded for the 1st place in the Microsite Competition.. (Bottom Left) Ntua Student members posing with Mr. Erik Seither and Sofia Iliogrammenou . (Bottom Right) The Greek Section was awarded the honorary title of Top Super Section.

Students Show Strong Greek Presence at SNAME Annual Meeting

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products from a variety of companies from different sectors. They also attended several technical presentations each day including the presentation by their Professor Apostolos Papanikolaou "GOALDS-Goal Based Damage Stability Objectives & Overview of Results".

Awards & Achievements

The Greek Student Section had quite a few remarkable achievements. Two of our students (Ilias Soultanias, Efstathios Karlis) were awarded in the student design competition winning the second and third place respectively.

Our microsite and social media presence won the First place at the Student "Microsite Competition" receiving a prize of 250\$ and an honorable mention

at the Awards Luncheon. In order to strengthen our nomination, we created a presentation in which we summarized our Microsite features. In this presentation we strongly mentioned the importance of our sponsors' help and especially the one from the "Stavros Niarchos Foundation". Last but not least, Ilias Soultanias was elected in the position of "Electronic Media Chair" of the Student Steering Committee.

We consider important to mention that in the discussion that followed the elections the Greek Student Section was recognized by all attendants as the most successful International one and the most capable of mentoring newly founded international Sections.

Annual Banquet Starts with Greek National Anthem among US & Canadian

A notable moment of the Annual Meeting was the formal Annual Banquet,

where SNAME presented its highest awards and honors in front of some 800 participants. The banquet begins with the singing of the US and Canadian anthems and the display of their country's flags. Carrying on the tradition from 2010 the Greek delegation sang the Greek National Anthem next to the Greek flag.

Greek Section Named Best of the Best

The Greek Section was awarded for the second consecutive year the honorary title of "Top Super Section" in Honor of Excellence for meeting the high SNAME operational standards , among 17 other Sections , 16 of which are in North America. Finally, we returned to Greece on November 11th, 2013 with the best of impressions and having gained important knowledge and experience.

Open Air Reunion Meeting of the NTUA Student Section of SNAME

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Academic operations in NTUA this year did not start until the first week of December. Because of this we decided to organize an outdoor event in order to keep the members of our Society together and attract new members to our Society. During the event we informed the attendants about this year's plans and goals and asked them to share their thoughts with us feeling free to make their own suggestions.

Some snacks, soft drinks and pizza were also offered to the participants. We would like to thank the attendants, both members and non members, for their presence and to assure them that such relaxing gatherings will be organized again during the academic year.



Showing Support (Top) all of the participants pose for a commemorative photo

Mandell and Lester Rosenblatt Undergraduate Scholarship

We are happy to announce that Senior Chair of our section, Eleni Lazaratou, is one of the recipients of the Mandell and Lester Rosenblatt Undergraduate Scholarship of SNAME for the 2013-2014 year. It is the first time that a member of the NTUA Student Section of SNAME is the lucky recipient of this scholarship.

Mandell and Lester Rosenblatt founded M. Rosenblatt & Son, Inc. in 1947. Through the unending drive of its founders, the company grew to be one of the world's largest private naval architecture and marine engineering firms. The founders led the company in the design and development of all types of naval and commercial ships. The Rosenblatts' expertise extended from aircraft carriers and submarines to tankers, tugs and high performance craft. Many of the world's most innovative designs can be attributed to the company. SNAME remembers and celebrates the combined legacy of Mandell and Lester Rosenblatt through the scholarship dedicated in their names. First awarded in 2007, the Mandell and Lester Rosenblatt Scholarship provides a maximum award of \$6,000 to an undergraduate scholar having a passion for naval architecture, marine or ocean engineering, and displaying evidence of professionalism and involvement in SNAME.



Eleni Lazaratou was born in Athens but raised in Houston, Texas, where she graduated high school ranked first in her class of over 700 students. A student of Naval Architecture and Marine Engineering at the National Technical University of Athens, she has been the lucky recipient of several scholarships for her studies including a Mandell and Lester Rosenblatt Undergraduate Scholarship from SNAME, the Thomaïdis Award from NTUA and an award for academic performance from the National State Scholarship Foundation of Greece. Having interned in London at the offshore consultancy Global Maritime and in Piraeus for class society Bureau Veritas, she is currently working in the operations department of Maran Gas Maritime while completing her five-year degree. Eleni is a dedicated SNAME member who has served as Secretary and Chair of the Greek student section and continues this year serving in the advisory role of Senior Chair.

SNAME Student Work: Computational study of flow and combustion in a large two-stroke marine Diesel engine

by Christina Malikouti

The reduction of greenhouse gas and pollutant emissions from ships has become a primary concern for the marine sector. To control the consequences of ship emissions on the environment, the International Maritime Organization (IMO), as well as local authorities, set regulations for a greener ship operation. For example, regarding nitric oxide emissions (NO_x), a drastic reduction of approximately 75% is foreseen in the Tier III regulations, to be implemented in 2016 (or later). In this frame, marine engine design and optimization for operation with reduced emissions is a major issue.

Nowadays, engine development can benefit from recent developments in Computational Fluid Dynamics (CFD). In the course of the Diploma Thesis of the author at the National Technical University of Athens (NTUA), a detailed study was performed, including code development, aiming at characterizing flow and combustion processes in a large two-stroke marine Diesel engine.

The engine belongs to the higher end, in terms of size and power, of the RT-flex series of Wärtsilä Switzerland, and is commonly used as the prime mover of large container ships. Each engine

cylinder has three identical injectors, which are located symmetrically on the periphery of the cylinder head, and one central exhaust valve. A strong air swirl motion is present, enabling an efficient scavenging. The main engine characteristics are presented in Table 1.

MANUFACTURER	WÄRTSILÄ SWITZERLAND
TYPE	RT-flex96C
BORE	960 mm
STROKE	2500 mm
MAX. ROTATIONAL SPEED	102 RPM
INJECTION SYSTEM	Common rail
NO. OF INJECTORS	3
MAXIMUM BHP PER CYLINDER	5720 KW

Table 1 Main Engine Characteristics

CFD studies require the generation of a sufficiently fine computational grid. In the present work, an existing grid generation software was further developed, resulting in a computational tool capable of an efficient generation of computational grids for marine engine applications, which involves a visual environment. The tool can be used to generate grids readily coupled with the KIVA-3 CFD code, which is appropriate for internal combustion engine applications. A representative grid is presented in Figure 1.

Extensive simulations were carried out, to characterize flow and combustion. The KIVA-3 version utilized includes

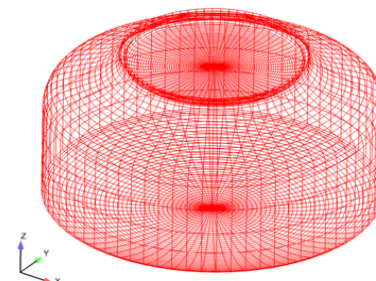


Figure 1 Computational Grid

physical models developed at NTUA and ETH Zurich. First, a reference case, characterized by continuous fuel injection, was computed, and results were compared against experimental pressure traces, provided by the manufacturer; a good agreement was established (see Figure 2). Next, the effect of the intensity of the air swirling motion on fuel-air mixing, heat release rate, production of pollutant emissions, as well as on the engine's thermal loading, was investigated. The results have demonstrated that a moderately high level of swirl intensity, close to that of the nominal engine design, corresponds to a proper balance of the above mentioned factors. Figure 3 presents visualizations of the computed temperature field, for different levels of air swirl intensity.

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About the Author...



Christina Malikouti has studied Naval Architecture and Marine Engineering at the National Technical University of Athens, and is a member of SNAME and IMAREST. She completed her studies in July 2013 by conducting her thesis within the Marine Engineering Sector of the School. Meanwhile, she has been keeping up with the sector's advances by attending several conferences and annual meetings hosted by SNAME, STG and the research team of the MARINELIVE project. She has worked as a trainee for the Technical Department of two shipping companies, having also attended part of the shipbuilding procedure and sea trials in the Dayang Shipyard in China. She has been admitted as a graduate student at the Technical University of Delft, where she is going to pursue the MSc in Marine Technology.

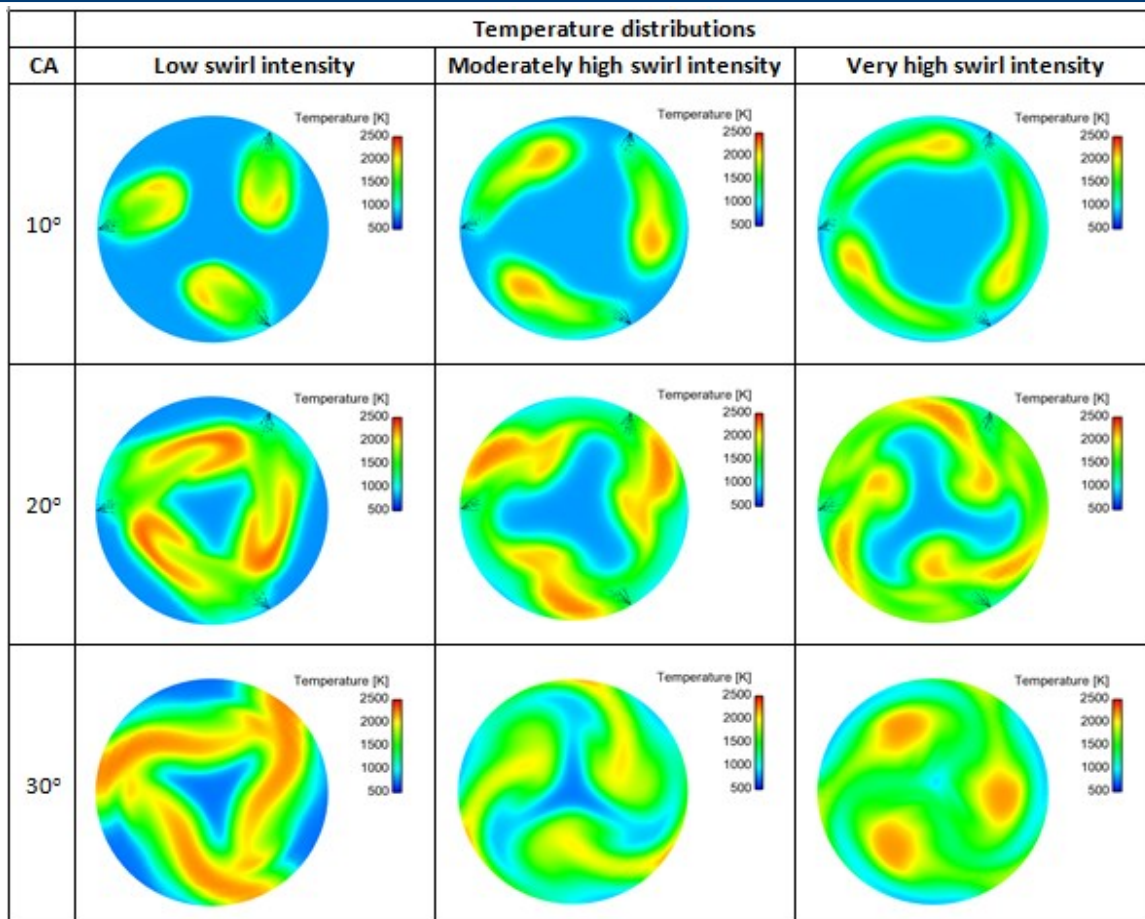


Figure 3 Color-coded contours of temperature at a plane including the injectors, at different values of the engine crank angle, for three cases corresponding to different levels of air swirl intensity.

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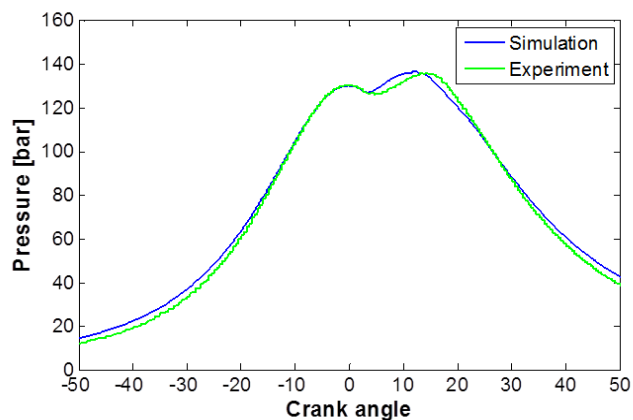


Figure 2 Reference case pressure histories for experiment and the present CFD results

In common rail engines, the injection profile can be electronically controlled, and thus can be varied in order to contribute to decreased fuel consumption and emissions formation. In the present work, a first attempt was made to implement an injection profile consisting of a pilot and a main injection event. Representative profiles are presented in Figure 4. The results were compared against the ones of continuous injection (reference case). Solutions were characterized in terms of specific fuel consumption and pollutant emissions.

In summary, in the present study, a computational tool was developed, enabling the efficient grid generation for CFD studies in large marine engines. The tool was applied, within the frame of the KIVA-3 CFD code, in characterizing flow and combustion in a large two-stroke marine Diesel engine. The present computational results demonstrate the potential of improving engine performance and emissions. Thus, a solid basis has been established, enabling further investigations,

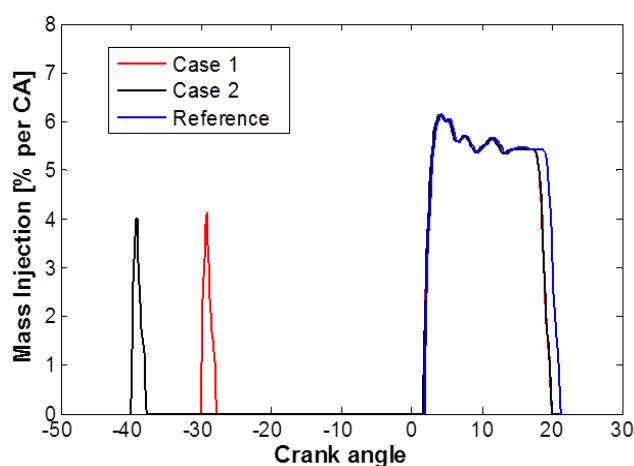


Figure 4 Sketch of the injection profiles consisting of pilot and main injection. A reference case of continuous injection is also included.

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which can include systematic optimization studies. The goal of such studies can be a proper determination of engine geometry and injection characteristics, for minimizing specific fuel consumption and pollutant emissions.

Setting off a new academic year in December

As a result of the situation, our university has been facing this autumn, the academic year will start in winter this year. Our student section, could not go on with the designed program of activities for this year so far, since it was impossible to gather our members. Although, we were happy to see friends and colleagues, have a talk and share our plans for the future during our outdoor meeting. For this year, there is a full program of interesting activities to come, like technical speeches and lectures, visits, members' meetings and so on. Keep updated on our news through our website, Facebook, Twitter and LinkedIn. Members' participation in our events will be considered positively for future activities. More information is coming soon, stay tuned.

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Please let SNAME know if you are about to graduate to receive your **graduation gift**. Send mail sname@elkco.gr.

Remember, for your first year after graduation you will be a an Associate Member in Transition and still pay the **student rate of \$35**.

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SNAME SCHOLARSHIPS

Scholarships are being provided by SNAME for studies in the naval architectural, marine engineering, ocean engineering or closely related fields. They are available to any student **regardless of nationality**. Applicants must be SNAME members, and preference is given to applicants planning to study in U.S. or Canadian schools.

Applications for the **graduate scholarships** can be downloaded from the SNAME web site. The completed application should be directed to Dr. Walter M. Maclean, Chairman, Scholarships Committee, 601 Pavonia Avenue, Suite 400, Jersey City, NJ 07306, before the **closing date of February 1, 2013** with all **supporting documents submitted by February 15, 2013**.

Thank you to the generous past and present sponsors of SNAME NTUA



SNAME GREEK SECTION