
The Centre for Maritime Engineering Education (CMEE)

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Gdynia Maritime University (GMU), Gdynia, Poland, is a specialised technical university with over 80 years of history and tradition. The mission of the University is to educate and train highly competent and proficient marine officers for the world's merchant fleet and fully qualified shore-based personnel. The studies are conducted at both undergraduate and postgraduate levels. Over 10,000 students per year take part in various education and training activities and the University employs close to 400 teaching staff to supervise the courses. The teaching facilities include well-equipped lecture theatres, laboratories and workshops. Also, the GMU operates several training vessels, including the famous tallship *Dar Młodzieży* (*Gift of Youth*), the flagship of the University. Students are accommodated in University-owned hostels. In 2001, the Centre for Maritime Engineering Education (CMEE) was established at the GMU as a satellite centre of the UICEE. The status, role and activities of the CMEE are presented and discussed in the paper.

INTRODUCTION

The Gdańsk-Sopot-Gdynia agglomeration has a special role in reviving and expanding the Polish economic base, with a wide range of industries. This region has a long and vibrant history and is regarded as one of the most attractive areas on the Baltic coast with the historic city of Gdańsk, the birthplace of *Solidarność*, the first free trade union in the former socialist bloc.

Gdynia is one of the most favourably located Polish cities, spreading over the hills, surrounded by forest, with many business ventures and tourist attractions. In 2001, Gdynia celebrated its 75th anniversary of foundation. It was built as the major Polish port at the time when Gdańsk was an independent city between the two World Wars.

Gdynia Maritime University

Gdynia Maritime University (GMU) Gdynia, Poland, is a modern higher education institution, which aims at meeting the needs of future maritime personnel in the years to come. At the turn of 2002/2003, the GMU employed almost 377 academic teachers, including 22 full professors, 45 professors of GMU and 118 assistant professors. Over 25% of the academic staff

holds merchant navy officer certificates. Among them are foreign trade masters, marine and chef engineers. The educational infrastructure comprises several dozens of specialised laboratories, such as the satellite navigational system (GPS), a radio-communication system (GMDSS), the planetarium, a simulator of marine power plants (ER-SIM), the radar simulator (ARPA), and the firing ground. The University computer network and the library, as well as the instrumental analysis laboratory, also meet the didactic and scientific needs of students, staff and alumni.

Each year, Gdynia Marine University educates about eight thousand intra- and extramural students, as well as several thousand students who attend the specialist training courses conducted by the Officer Training Centre and the Sea Rescue Training Centre. Moreover, foreign trade mates are trained on the models of different types of vessels in the Ship Manoeuvring Centre in Iława.

Gdynia Marine University prepares human resources for the sea economy through the following four faculties:

- Navigation;
- Marine Engineering;

- Marine Electrical Engineering;
- Business Administration.

The GMU is famous internationally for its research and teaching programmes, highly qualified and reputable staff and scores of graduates, who are each year being injected into international shipping companies.

BACKGROUND

Contacts between the then Gdynia Maritime Academy and the UICEE go back to 1995, when the Rector of the GMA, Prof. Józef Lisowski arrived in Melbourne, Australia, to attend the UNESCO 1995 *International Congress of Engineering Deans and Industry Leaders*, organised by the then UNESCO Supported International Centre for Engineering Education (USICEE), between 3 and 6 July 1995. Prof. Lisowski was one of about 20 members of the delegation of senior Polish academics attending the Congress. In his paper presentation, entitled *The engineering education and research for maritime industry – transfer of information and professional development*, Prof. Lisowski presented the teaching, research and development activities of the GMA in the context of the changes in the Polish university sector, resulting from the transition from a centralised economy to a free market economy [1]. Extensive discussions with the USICEE Director resulted in the idea of establishing close cooperation between the GMA and the USICEE.

In September of the same year, on the invitation of the Rector, the USICEE Director paid a visit to the GMA, where the immediate collaborative plans were discussed and instituted. The most urgent decision was made to organise jointly the *3rd East-West Congress on Engineering Education*, with the GMA accepting the task of being the host of the Congress. The then Vice-Rector of the GMA, Prof. Romuald Cwilewicz, was designated to be the GMA representative, and to work with the USICEE on this project.

The Congress, under the theme *Re-vitalising Academia/Industry Links*, was held at the GMA between 15 and 20 September 1996. It was an extremely successful venture, with over 170 delegates from 33 countries worldwide. Over 100 papers were presented, which covered almost every aspect of engineering education, and were included in a hardbound volume of Congress Proceedings [2]. The Congress also stimulated the publication of two special issues of the initial volume of the *Global Journal of Engineering Education* (Vol.1, No.1 & 2.).

As a result of this successful venture, the GMA decided to join the UICEE as a contributing member of the UICEE in early 1998, with Prof. R. Cwilewicz becoming the representative of the GMA within the UICEE. After becoming formally a member of the UICEE, several staff members of the GMA decided to intensify their involvement with the UICEE by attending UICEE conferences and submitting their papers and articles to the UICEE publications. The involvement of the UICEE Director in the life of the GMA was also increased with several official visits to the Academy in Gdynia, and the contribution to its research and development activities, which have resulted in the publication of numerous joint papers with Prof. R. Cwilewicz and his team.

In September 2000, this led to the decision to organise the *5th Baltic Region Seminar on Engineering Education* at the GMA, with the GMA providing the venue and financial support for the Seminar. The Seminar was held at the GMA between 17 and 19 September 2001, in the aftermath of the tragic events of 11 September 2001, which grossly affected the participation in the Seminar by international colleagues, as well as the atmosphere within which the Seminar was conducted. Nevertheless, the Seminar was academically very successful with close to 40 papers presented. More importantly, the Memorandum of Agreement on Partnership between the GMA and the UICEE was signed by the then Rector of the GMA, Prof. Piotr Przybyłowski and the UICEE Director, at the Seminar's gala dinner on 18 September 2001 [3].

It should be mentioned at this point that due to its exceptional academic achievements, the Polish Parliament lifted the status of Gdynia Maritime Academy to become a fully-fledged university with its present name in English as Gdynia Maritime University (GMU) in 2002.

THE CMEE

Against this background, the decision by the then GMA Management to become a Partner Institution of the UNESCO International Centre for Engineering Education (UICEE) was based on the fact of longstanding collaboration with the UICEE, as well as strong links established with other members of the UICEE global network. In so doing, both parties identified the urgent need for the establishment of this Partnership and the founding of a centre that would carry out research and development activities specifically dedicated to maritime engineering education. Such a centre would also cater for the continuing education needs of maritime personnel.

Based on the Partnership Agreement, the *Centre for Maritime Engineering Education* (CMEE) was established in late 2001 as a satellite centre of the UICEE, with Prof. R. Cwilewicz appointed as its Foundation Director. The general mission of the CMEE is to promote and carry out the quality development in education and training at Gdynia Maritime University (GMU), Gdynia, Poland.

In establishing this initiative, the global leading role of the GMU was taken into account and its long commitment to engineering education. The foundation of this satellite centre opened up the establishment of a network of so-called topical satellite centres that operate within one specific area of academic endeavour. In particular, the satellite centre, working with the UICEE, provides the focus for the development of academic and research related activities in engineering education within the sphere of maritime engineering and endeavours to work in order to further the globalisation of engineering education [3].

The paramount objective of the CMEE is to facilitate research, development and transfer of information on maritime engineering education on a global scale.

Goals and Objectives

A number of significant goals and objectives were identified, and are being pursued in order to cultivate the knowledge and skills essential for high quality maritime engineering education. These activities include:

- Enhance and facilitate maritime engineering education throughout the entire UICEE *Global Network of Engineering Education*.
- Exchange scholars, as appropriate, to take forward academic and research related activities in engineering education.
- To work together to take forward seminars, workshops, conferences and other academic meetings as appropriate, and to support the production of publications, books and software in engineering education.
- Provide a focus for academic and research activities related to the work on maritime engineering education.
- Reflect the mission, aims and objectives of the UICEE.
- Collect and transfer information on advances in engineering education and develop modern techniques for the dissemination of this knowledge.

Activities

The following four areas of activities have been identified and pursued on the commencement of the CMEE:

- Investigation of the effectiveness of simulators in maritime engineering education.
- Verification of the development of the standards for communication in ship's engine rooms.
- Train the trainer activities in maritime engineering education.
- Organise and carry out specialised conferences and meetings in maritime engineering education.

Personnel

The Centre for Maritime Engineering Education currently employs five staff members, acting in the following roles:

- Prof. Romuald Cwilewicz – Director
- Assoc. Prof. Stefan Kluj – staff member
- Assoc. Prof. Leonard Tomczak – staff member
- Mr Rafał Pawletko – Assistant/Coordinator
- Mrs Iwona Budniak – Head of Administration

PUBLICATIONS

The following publications have been accomplished by those academics closely related to the CMEE:

1. Cwilewicz, R., The use of simulators in the education of engine room officers in Gdynia Maritime Academy. *Proc. 1st Asia-Pacific Forum on Engng. and Technology Educ.*, Melbourne, Australia, 180-182 (1997).
2. Cwilewicz, R. and Mindykowski, J., A new approach to the engineering education of seafarers in the wake of further developments in IMO instruments. *Global J. of Engng. Educ.*, 1, 2, 201-209 (1997).
3. Cwilewicz, R., New didactic methods used in education process of engine room officers in Gdynia Maritime Academy. *Proc. 1st Latin American and the Caribbean Forum on Engng. and Technology Educ.*, Puebla, Mexico (1998).
4. Cwilewicz, R. and Mindykowski, J., Virtual reality problems in the engineering education of seafarers. *Proc. Global Congress on Engng. Educ.*, Krakow, Poland, 253-256 (1998).
5. Cwilewicz, R. and Pudlowski, Z.J., Effective training of engine room officers at the Gdynia

- Maritime Academy, Poland. *Proc. 2nd Baltic Region Seminar on Engng. Educ.*, Riga, Latvia, 114-116 (1998).
6. Cwilewicz, R. and Pudlowski, Z.J., New didactic methods used in the education process of engine room officers. *Proc. 90th Anniversary Jubilee Seminar on Engng. Educ.*, Wismar, Germany (1998).
 7. Cwilewicz, R. and Tomczak, L., Safety and environmental aspects of Computers Based Training (CBT) - interactive programs application for students and engine room officers. *Proc. Conf. on Maritime Educ. and Training PADACC*, Opatija, Croatia (1999).
 8. Cwilewicz, R., Tomczak, L. and Pudlowski, Z.J., The application of interactive Computer Based Training (CBT) programs in engineering education. *Proc. 3rd Baltic Region Seminar on Engng. Educ.*, Göteborg, Sweden, 113-116 (1999).
 9. Cwilewicz, R. and Pudlowski, Z.J., A new system of postgraduate education of engine room officers at the Gdynia Maritime Academy. *Global J. of Engng. Educ.*, 3, 3, 273-277 (1999).
 10. Cwilewicz, R., Tomczak, L. and Pudlowski, Z.J., The application of simulators in marine engineering education. *Proc. 2nd Global Congress on Engng. Educ.*, Wismar, Germany, 138-140 (2000).
 11. Cwilewicz, R., Tomczak, L. and Pudlowski, Z.J., Computer Based Training (CBT): the application of interactive programs in maritime education and training. *Proc. 4th Baltic Region Seminar on Engng. Educ.*, Copenhagen, Denmark, 62-65 (2000).
 12. Cwilewicz, R., Tomczak, L. and Pudlowski, Z.J., New technologies for the effective training of marine engineers. *Proc. 4th UICEE Annual Conf. on Engng. Educ.*, Bangkok, Thailand, 270-273 (2001).
 13. Cwilewicz, R., Gałecki, W., Tomczak, L. and Pudlowski, Z.J., Computer-based training innovations in a marine diesel engines laboratory. *Proc. 5th Baltic Region Seminar on Engng. Educ.*, Gdynia, Poland, 13-16 (2001).
 14. Kluj, S., Computer Aided Assessment for engine room simulators. *Proc. 5th Baltic Region Seminar on Engng. Educ.*, Gdynia, Poland, 21-24 (2001).
 15. Cwilewicz, R. and Hajduk, T., Application of a liquefied petroleum gas-handling simulator – LPG type as a modern didactic tool in marine engineering education. *Proc. 5th Baltic Region Seminar on Engng. Educ.*, Gdynia, Poland, 25-28 (2001).
 16. Cwilewicz, R., Tomczak, L. and Pudlowski, Z.J., The effective application of engine room simulators in marine engineering education. *Proc. 3rd Global Congress on Engng. Educ.*, Glasgow, Scotland, UK, 316-318 (2002).
 17. Kluj, S., The potential of Computer Aided Learning and its impact on marine engineering education and training. *Proc. 3rd Global Congress on Engng. Educ.*, Glasgow, Scotland, UK, 342-344 (2002).
 18. Cwilewicz, R., Tomczak, L. and Pudlowski, Z.J., The application of simulation techniques in marine engineering education. *Proc. 6th Baltic Region Seminar on Engng. Educ.*, Wismar/Warnemünde, Germany, 165-168 (2002).
 19. Cwilewicz, R., Tomczak, L. and Pudlowski, Z.J., Practical aspects of conducting simulator exercises in marine engineering education. *Proc. 6th UICEE Annual Conf. on Engng. Educ.*, Cairns, Australia, 171-174 (2003).
 20. Cwilewicz R., Tomczak L. and Pudlowski Z.J., The development and application of Computer-Based Training programs in maritime engineering education. *Global J. of Engng. Educ.*, 7, 2, 209-218 (2003).
 21. Hajduk, T. and Bonca, Z., The application of checklists in the field of complex systems operation based on the operating experiences of a liquefied petroleum gas-handling simulator. *Proc. 7th Baltic Region Seminar on Engng. Educ.*, St Petersburg, Russia, 57-60 (2003).
 22. Kluj, S., Usability criteria for simulators applied in the maritime engineering education. *World Trans. on Engng. and Technology Educ.*, 2, 3, 445-448 (2003).

LOCATION AND CONTACTS

The CMEE is an integral part of Gdynia Maritime University, which provides the office and other facilities. The address and contacts are as follows:

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1. Lisowski, J., The engineering education and research for maritime industry – transfer of information and professional development. *Proc. 1995 Inter. Congress of Engng. Deans and*

Industry Leaders, Melbourne, Australia, 380-388 (1995).

2. *USICEE Newsletter*, 3, 2, 2, October (1996).
3. *UICEE Newsletter*, 8, 3, 3, November (2001).

BIOGRAPHY



Prof. Romuald Cwilewicz was born in 1939 in Gdynia, Poland. He graduated from the Technical University of Gdansk in 1962 with an MSc in mechanical engineering. In 1974, he gained a PhD, based on a dissertation concerning marine gas turbines, and a DSc in 1993 in the same specialisation.

He has been a professor of the Gdynia Maritime University (GMU) since 1993, and has held several managerial positions, including the position of

Vice-Rector for Educational Affairs (1990-1996) and Dean of the Faculty of Maritime Mechanical Engineering (1999-2002). He is presently Head of the Department of Marine Power Plants and Vice-Rector for Educational Affairs.

His professional interests are in the optimisation of power engineering processes and diagnostics of ships' technical systems. He has published extensively, and is the author or co-author of many journal articles, conference papers and patents concerning his field of specialisation, as well as engineering education. Also, he was a Visiting Professor of the Hochschule Bremerhaven and Shanghai Maritime University.

Prof. R. Cwilewicz is an active member of the UICEE, and is Director of the Centre for Maritime Engineering Education (CMEE), a satellite centre of the UICEE, based at the GMU. He was awarded the UICEE Silver Badge of Honour in 1997 at the *1st Asia-Pacific Forum on Engineering & Technology Education*.

**Conference Proceedings of the
7th UICEE Annual Conference on Engineering Education
under the theme: *Educating for the Global Community***

edited by Zenon J. Pudlowski

The 7th UICEE Annual Conference on Engineering Education, held under the theme of *Educating for the Global Community*, was organised by the UNESCO International Centre for Engineering Education (UICEE) and was staged in Mumbai, Maharashtra State, India, between 9 and 13 February 2004.

This volume of Proceedings includes papers submitted to this Conference and offers a diverse compendium of articles that detail various international approaches to engineering education research and development related to the Conference theme, as well as other specific activities.

The 47 published papers, representing 21 countries, offer an excellent collection of works that tackle fundamental issues, concepts and achievements of individual researchers, as well as the concerns and challenges regarding engineering and technology education in different cultures.

The papers have been organised into the following groups:

- Opening and Keynote addresses
- Multimedia and the Internet in engineering education
- Quality issues and improvements in engineering education
- Innovation and alternatives in engineering education
- International examples of engineering education and training
- New trends and approaches to engineering education
- Important issues and challenges in engineering education
- Specific engineering education programmes

The variation of subjects, concepts, ideas and international backgrounds in this volume of Proceedings demonstrate the global nature of UICEE-run Conferences, as well as its relevance within the worldwide affairs related to engineering and technology education.

In order to ensure the high quality and value of the Proceedings into the future, all of the papers have undergone assessment by independent international peer referees and have been professionally edited. As such, it is envisaged that this volume will become a useful source of information on research and development activities in engineering and technology education, seen within the context of educating future engineers for the global community.

In order to purchase a copy of the Proceedings, a cheque for \$A100 (+ \$A10 for postage within Australia, and \$A20 for overseas postage) should be made payable to Monash University - UICEE, and sent to: Administrative Officer, UICEE, Faculty of Engineering, Monash University, Clayton, Victoria 3800, Australia. Tel: +61 3 990-54977 Fax: +61 3 990-51547