

# AUSTRALASIAN ASSOCIATION FOR ENGINEERING EDUCATION

## NEWSLETTER

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*The 3rd World Conference on Engineering Education was held at The University of Portsmouth, UK, between 21 and 25 September 1992 on behalf of the International Liaison Group on Engineering Education (ILG-EE). Picture above shows the Conference Chairman, Professor Terry V. Duggan introducing HRH the Duke of Kent, KG (centre), who officially opened the Conference. Seated next to the Duke of Kent is the ILG-EE Secretary, Dr Zenon J. Pudlowski, who chaired the Official Opening Ceremony on behalf of the ILG-EE.*

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## 4TH ANNUAL CONVENTION AND CONFERENCE

### *NEW OPPORTUNITIES AND CHALLENGES FOR ENGINEERING EDUCATION*

The University of Queensland

13-16 December 1992

### AN INVITATION TO ATTEND THE CONFERENCE

The theme of the conference, *New Opportunities and Challenges for Engineering Education*, reflects events that have followed the Government's 1991 commitment to industrial revitalisation. There is now widespread recognition that engineering must be a central element in Australia's efforts to achieve industrial competitiveness.

Government initiatives are now delineating our *opportunities*. The Department of Employment, Education and Training has announced the funding of three Advanced Engineering Centres, and is developing policy on the maintenance and enhancement of existing engineering schools and an expansion of 3-year BTech programs. The new *challenges* for engineering educators are to fill - and where necessary, reshape - the government's outlines of programs and to respond to the new phenomenon of Quality Assurance in higher education.

Four keynote speakers will address the key issues facing engineering educators. They are:

- \* Dr Don Anderson, Chair, Committee for the Advancement of Engineering Teaching.
- \* Professor Terry V. Duggan, Dean of Engineering, The University of Portsmouth and Chairman of the International Liaison Group on Engineering Education.
- \* Dr David Warren Piper, Director, The Tertiary Education Institute, The University of Queensland.
- \* Dr Brian E. Lloyd, Deputy President, The Institution of Engineers, Australia.

In addition, it is likely that a mystery speaker will address the Conference Dinner, as we ply the Brisbane River on a paddlewheeler.

Over 120 papers have been received. In the spirit of high quality engineering education, we have set speakers the challenge of putting their messages across in a lively format - something of an "ideas bazaar".

We invite you to join the 150 expected registrants at a timely conference.

Registration forms have been sent to all AAEE members, and faculties and schools of engineering in Australasia. Further forms may be obtained by contacting Sally Brown on (07) 365 6360 or by fax on (07) 365 7099.

*Professor John M. Simmons  
Dean of Engineering  
The University of Queensland  
Conference Chairperson*



## FROM THE PRESIDENT

### 3rd World Conference on Engineering Education, Portsmouth - September 1992

Over 400 delegates attended this conference, presided over by Eur Ing Professor Terry V. Duggan of the University of Portsmouth (formerly Portsmouth Polytechnic). Nearly half the delegates were from the the UK, with 37 from Eastern Europe, 24 from the USA, 20 from Australia, 18 from Canada, 14 from Asia, and two from New Zealand, with the balance mostly from Western Europe. As reported elsewhere by the Conference Chairman, Professor Terry Duggan, the session topics included access, quality, academic-industry partnerships, teaching innovations and new technology, environmental issues, etc.

To me, the British delegates conveyed a gloomy impression, both of the state of British industry and also of engineering education in the UK, somewhat similar to our own darkest moods in the recessions. The state of Australian engineering education seems relatively healthy by comparison.

The high profile of our own Association was reflected in the omnipresence of Dr Z.J. Pudlowski, and in keynote addresses by both Professor Trevor Cole and myself. The AAEE already has a good deal of clout on the international engineering education scene because we have the second largest membership of any association in the world (now over 600 members and growing rapidly). Our Association is also well represented on the International Liaison Group for Engineering Education (ILG-EE), whose new Chairman is Professor Duggan.

### Quality Management and World Best Practice

The quality of engineering education is under review worldwide, reflecting concepts now well known in industry and the relentless pressures to measure outputs and enhance efficiency and effectiveness. Much has been written of late on the application of quality management to universities. The Higher Education Council Draft Advice to NBEET of July 1992, *The Quality of Higher Education*, is well worth reading. In simple terms, there is much to be gained by developing a customer focus, by reviewing all of our educational operations and developing the instruments and statistical information necessary for those reviews, and by involving the teaching staff in creative thinking about our performance and the quality of our *products*. Clearly the AAEE has a large role to play in this area and should be at the front of the quality debate. Alternatively, there is much to be lost by haughty isolationism from the quality issues, on the assumption that they are irrelevant or inapplicable to our particular enterprise.

### The HEC paper on Quality is worth quoting:

*The provision of (tertiary teaching) training should not be seen as an imposition upon staff, but rather as an enabling device; one which allows them to perform at the highest possible standard as teachers, just as the years of research training of most academics enables them to undertake high quality research during their academic careers. And*

*Good teaching depends in part at least on the objectives set for the program and on the quality of interaction with those being taught. Good teaching also needs to be supported by strong course administration and academic procedures, such as efficient and fair operation of examinations, accurate, sympathetic timetabling of classes, maintenance of teaching equipment and quality of teaching space.*

### The Competency Movement

Competency standards are explicit statements of competent performance in the workplace and are designed to identify occupational work levels and facilitate career progression between these levels. Competency standards are being developed by some twenty professionals in



Australia. Prominent among these groups is the Institution of Engineers, Australia, which has been contracted by the Commonwealth Government to develop National Competency Standards for the engineering profession and articulation of those standards with others for engineering technologists and engineering associates. A large body of documentation has already been developed.

In my opinion, there is a danger that this project will become a massively bureaucratic exercise. The explicit details and complete specification of all the skills and attitudes required at all levels of the engineering workforce in all disciplines is a truly massive task. It is inevitable that these specifications will become a *de facto* alternative checklist to be used in the accreditation of engineering courses. This brings in turn the danger of uniformity across the system.

Uneasiness about the competency movement has put universities in the somewhat embarrassing situation of trying to define exactly what it is that they do, and what qualities are instilled in their graduates. A good deal of flowery, pompous rhetoric has, as a result, been generated. On a more positive note, it is again worthwhile to quote from the HEC paper on quality:

*Many features of the competency-based approach are thoroughly consistent with the best practice of higher education and advanced professional training, including the definition of clear objectives, the rational alignment of content to the purpose of an award, and a commitment to fair assessment clearly linked to objectives and purpose. The notion that the time students need to devote to achieve a particular qualifications may vary, without prejudice to quality, is also worthy of serious and systematic examination. The higher education sector can gain from the experience of the competency movement, particularly as it goes about setting objectives for awards and in identifying and enhancing the attributes of graduates.*

#### **The 4th Annual Convention and Conference of AAEE**

Professor John Simmons, Dean of Engineering at the University of Queensland, and his Organising Committee have planned a stimulating conference to be held in Brisbane on December 13th to 16th. A large number of good papers have been submitted. I hope to see many of you there.

*Professor Peter LeP Darvall  
Dean of Engineering  
Monash University  
President of the AAEE*

#### **WORLD CONFERENCE ON ENGINEERING EDUCATION - A Summary by the Conference Chairman**

The World Conference on Engineering Education, hosted by the University of Portsmouth and chaired by Professor Terry Duggan, Dean of Engineering, took place in Portsmouth on 20 - 25 September 1992. This conference, which was the third in the series, was organised by the University of Portsmouth on behalf of the International Liaison Group on Engineering Education (ILG-EE) in cooperation with the University of Surrey and the Société Européenne pour la Formation des Ingénieurs (SEFI). It follows the first conference held in Cologne in 1984 under the joint chairmanship of Professor J.L. Atrops and Professor Michael Wald, and the second in Sydney in 1989 under the chairmanship of Professor Hugo K. Messerle.

The Conference was officially opened by His Royal Highness the Duke of Kent, and attracted more than 400 delegates from 42 countries, including Australia, Indonesia, the Philippines, North America, most of Europe, India, South Africa, and the People's Republic of China. There was a good representation from Eastern Europe, assisted by a TEMPUS



grant from the European Community.

His Royal Highness the Duke of Kent, in his opening address, emphasised the need to provide decent material standards for the world's population, whilst at the same time continuing to enhance the environment. This sentiment was reiterated many times by the many distinguished guests, plenary speakers and delegates throughout the conference.

The achievements of engineering-based industries are crucial to meeting these needs, and delegates were unanimous in their call upon governments to recognise the necessity for sustained investment in engineering education first at the formation stage and then continuing throughout professional careers.

Nearly 300 papers, including 12 keynote addresses were presented, in addition to the poster session, and delegates participated in 100 hours of formal discussions and enjoyed an exhibition put on by 18 organisations and companies supporting engineering education.



*Picture above shows the Conference Chairman, Professor Terry V. Duggan, Dean of Engineering at the University of Portsmouth, addressing conference participants.*

The increasing responsibility of the engineer makes the need for international cooperation amongst the engineering community more important than ever. Delegates were able to identify and discuss a wide spectrum of positive developments in the education of engineers. Because of the necessity for engineers to exercise leadership, participate in important political decisions and contribute to national debates on important issues, such as those affecting the environment, methodologies for developing good communication and interpersonal skills were the subject of many papers and produced lively discussions. Considerable attention was devoted to developing the creative aspects of engineering, and to the importance of project work and design teaching in achieving this.

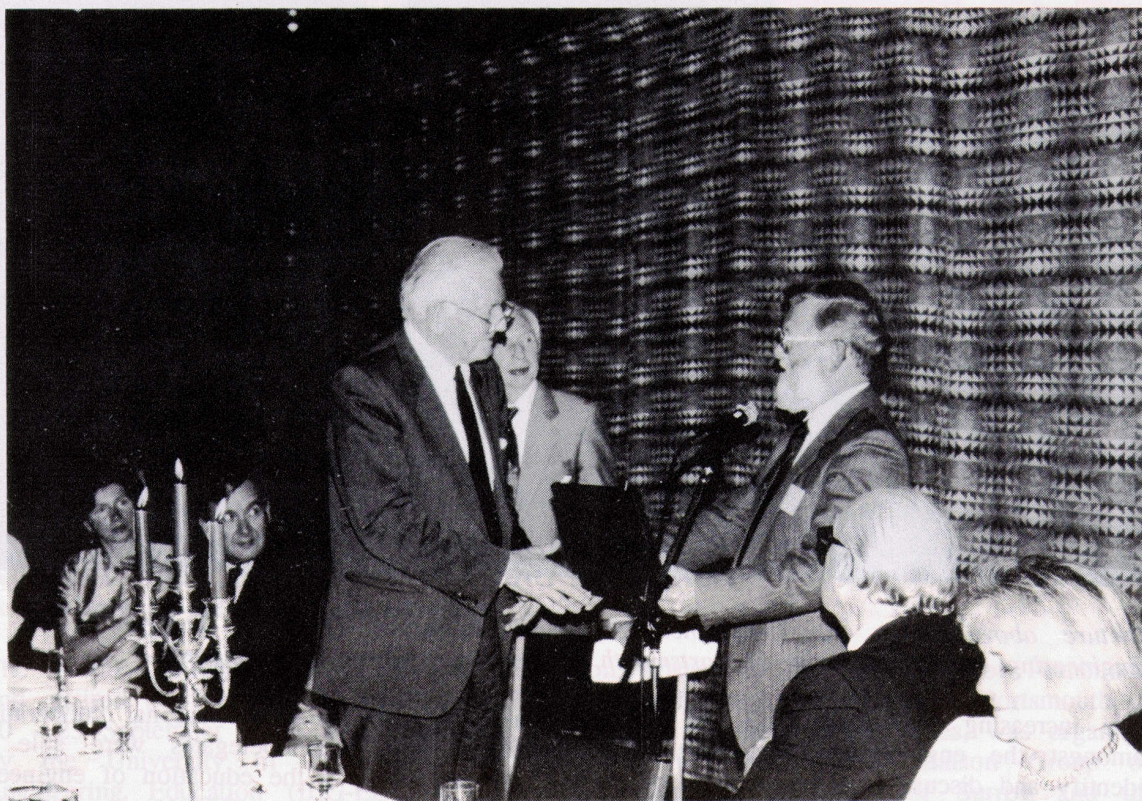
The Conference demonstrated - what most engineering educators already know! - that engineering is a liberal education, serving the needs of society and individuals, and



providing a sound basis for life itself. Whilst engineering is a liberal art, it is also a practical one, strongly based on theory, and the Conference provided the opportunity for sharing ideas and experiences on how these various strands can be brought together in an appealing and effective way. Interaction between engineering education and industry is necessary to the well being of both, and there were many excellent papers on the various ways in which this can be promoted to mutual advantage.

Perhaps one of the most significant features of this very important World Conference was the almost ready acceptance that radical changes are required in the structure and contents of engineering courses. These changes, which are based upon the necessity to promote life-long learning, include the recognition of the need for more flexible study programmes, providing a broader base, and achieving greater integration between the disciplines. Particular attention was given to the spectrum of needs required in providing engineering education, most notably the relationship between technician and professional engineering at the stage of initial formation and subsequent professional development.

The Conference Chairman, Professor Terry Duggan, in his opening keynote address, suggested that it was appropriate to consider the establishment of a British Association for Engineering Education in order to provide parity with other countries. Considerable support for this initiative was expressed by many UK delegates, recognising that this would strengthen the integration of engineering in the UK, rather than provide yet another organisation leading to further fragmentation.



*Picture above shows Sir Robert Telford receiving the SEFI Leonardo da Vinci Medal from the SEFI President, Professor Evan R. Petty of the University of Limerick (Ireland).*

Integrated with the World Conference was the annual meeting of the Société Européenne pour la Formation des Ingénieurs, providing workshop sessions and meetings relating specifically to European issues. These included meetings of the SEFI Working Groups on Environmental Engineering, Engineering Education and Developing Countries, Curriculum Development, Continuing Engineering Education, International Exchanges and Mathematical



Education of Engineers. It also included a meeting of the SEFI President with the Working Group Chairmen and the Second SEFI Administrative Council Meeting.

A special meeting of the International Liaison Group on Engineering Education (ILG-EE) was held during the Conference, at which Eur Ing Professor Terry Duggan (United Kingdom) was elected Chairman; Professor Dr Michael Wald (Germany), Professor Dr Jan Krynski (Poland) and Professor Russel Jones (United States of America) were elected Vice-Chairmen; Dr Zenon Pudlowski (Australia) and Mr Graham White (United Kingdom) were elected Secretary and Treasurer, respectively.



*The team of the Faculty of Engineering at The University of Portsmouth, which put the Conference together, is shown above. Standing are (l-r) Prof. T.V. Duggan and Mr David Perks, seated are (l-r) Ms Denise Olway and Mrs Christine Asher.*

The delegates noted with pleasure the overwhelming success of this major event (recognising that this was due in no small way to the dedication and hard work of members of the Local Organising Committee) in bringing together engineering educators from all parts of the world and resolved to meet again in three years time at a place and venue to be determined by the International Liaison Group on Engineering Education. Invitations to submit bids have already been sent to all the delegates who attended.

In addition to the formal sessions and proceedings there was ample opportunity for informal discussions and debate in the course of an extensive social programme. This included a civic reception generously hosted by the Lord Mayor of Portsmouth; an evening of Victorian old time music hall entertainment in the historic Theatre Royal, followed by an excellent buffet supper, on this occasion generously hosted by the University of Portsmouth; and the Conference Banquet in the Portsmouth Guildhall, at which Sir Robert Telford received the SEFI award of the Leonardo da Vinci medal. There was also the opportunity for all members of the International Liaison Group for Engineering Education, the Local Organising Committee, the International Advisory Committee, and a number of special guests, to attend a most enjoyable evening, including dinner, on the first iron clad warship



- *HMS Warrior*. These conference integrated social activities were complemented by an enjoyable accompanying persons' programme.

The conference papers have been published in three high quality volumes, totalling nearly 1800 pages, covering a wide range of themes including international, quality and environmental issues (Volume 1), innovation, teaching and management (Volume 2) and industrial links, computers and design (Volume 3). Copies of the proceedings may be purchased at a special discount price of 150 (plus post and packing 16 surface or 22 air mail) directly from the publishers at the following address:

Computational Mechanics Publications, Wessex Institute of Technology (University of Portsmouth), Ashurst Lodge, Ashurst, Southampton SO4 2AA, United Kingdom.

*Professor Terry V. Duggan  
Dean of Engineering  
The University of Portsmouth  
United Kingdom  
Conference Chairman*

#### **AUSTRALIANS HELP POLISH TECHNICAL UNIVERSITIES ESTABLISH NEW ENGINEERING COURSES**

Congratulations are in order to our Executive Director, Dr Zenon Pudlowski, who has been appointed Foundation Dean and Professor at the International Faculty of Engineering at the Technical University of Lodz, Poland. As a part of this appointment, Dr Pudlowski chaired a workshop at Spala, Poland, 11-18 June 1992, to discuss a range of issues relating to the faculty's establishment.

The paramount objective of the Faculty is to educate professional engineers who can demonstrate a sound foundation in science, engineering, technology, management and commerce with proficiency in English.

The establishment of the International Faculty of Engineering is the result of extremely successful collaboration between Australian and Polish academics. It enjoys the support of the Australian Ambassador to the Republic of Poland, His Excellency Mr Anthony C. Kevin; The Institution of Engineers, Australia; and numerous professional organisations and academic institutions worldwide. The Faculty employs a number of highly qualified, experienced and motivated academics. In addition, outstanding international visiting academics are associated with the Faculty. They advise the Faculty Board and the Dean on academic and administrative matters through an International Advisory Committee.

At the workshop, distinguished academics from Australia, the United Kingdom, USA, Czecho-Slovakia and Italy joined in discussions with members of the staff of The Technical University of Lodz and several other Polish universities to examine the viability of a degree of Bachelor of Engineering in Electromechanics. Australia was represented at the workshop by Professor Trevor W. Cole, Dr Zenon J. Pudlowski, Dr William N. Roebuck (appointed Executive Secretary to the International Advisory Committee), Dr Janusz Buczkowski and Mr Tadeusz Woszczylo. Strong support has also come from Canada, France, Germany and the Republic of South Africa. All of the countries have contributed to the establishment of the new faculty and the development of this undergraduate program.

There was very strong agreement that such a course was urgently needed and viable. Such a course would significantly enhance Poland as a centre of engineering studies, particularly in electromechanics. It was agreed that the course should be taught in the English language and be available not only to students from Poland but also to students from Eastern, Central and Western Europe, and from a range of other countries. This decision was made after examining the aims and objectives, through a mission statement, followed by the development of a business plan. From these it was agreed that, subject to finance being



available, the course should commence in the latter part of 1993. The course's duration would be four years.

The general aim of the program is to educate a technically proficient, entrepreneurial engineer and manager who is fluent in the English language in addition to his or her native tongue. Provision will be made to provide students with the opportunity of learning other European languages as optional courses. The products of the degree program would aid in the development of Polish industry and commerce, particularly in small to medium sized industries and businesses. They should also be of significant assistance to other countries in a field that is not well catered for at other academic institutions. A decision was made to include such matters as electrical/mechanical design and servicing in the areas of robotics, mechatronics, industrial automation, manufacturing technologies, automated manufacturing, industrial systems control, systems engineering, signal processing, information engineering, data communications, digital systems, electromagnetics, real time systems and photonics.

As well as being assessed as competent in engineering and technology, it was agreed that the product of such a program of education and training must be very practical and be able to competently trouble-shoot problems, have a high level of communication skills, and be able to manage people and situations. A further ingredient would be the development and exercise of leadership and entrepreneurial skills.

The academic merit of the course, as well as subject details, was thoroughly examined and assessed. After considerable and, at times vigorous, discussion it was agreed that the course was well-structured and academically sound and should form an excellent foundation for this particular engineering specialty.

The program structure, the courses developed and the teaching methods adopted, with particular emphasis on hands-on experience, will improve the status and quality of the students' understanding of technology and production processes. Emphasis is being placed on the development of personal skills such as the ability to solve problems, initiative, organisational and communication skills. In first year, particular attention is given to *English and Communication Skills*, an integrated subject consisting of such modules as an intensive course in English, a technical drawing course, a problem solving course, an engineering writing and presentation course and a computer graphics for engineering drawing course.

Substantial grants have been received from the Australian government and the Polish Ministry of National Education to support the Faculty and its operation. An Information Resource Centre, consisting of a specialised library, a computer centre and an English language centre, as well as a number of teaching laboratories, are supported by these grants.

It was indeed a most successful workshop which was also (briefly) attended by the Australian Ambassador to Poland. It is well to point out that Mr Anthony C. Kevin is a graduate in civil engineering from The University of Sydney.

The initial funding made available by the Ambassador and the promise of future funding by both the Australian and Polish Governments should ensure that the first degree program will commence in October 1993. This will be an integrated four year Bachelor of Engineering (BEng) degree program in electromechanical engineering which will be taught in English.

May I personally commend this new, innovative engineering program to you as it promises to be a world-leader in quality, thrust, content and relevance, particularly to manufacturing and service industries. Those wishing to collaborate in the further design, development and implementation of this innovative program are invited to contact Dr Zenon J. Pudlowski.

Dr William N. Roebuck  
Department of Electrical Engineering  
The University of Sydney  
AAEE Secretary/Treasurer



## SPECIAL ISSUE OF THE *AJEE*

Our members will soon receive a special issue of the *Australasian Journal of Engineering Education* marked Vol.3, No.3. The release of this issue marks a special occasion for the Journal. This is the appearance of another issue (third) within one volume!

In producing this publication the paramount objective was to provide, not only to our subscribers but also to every member of the AAEE, information about the present status and quality of industry/academia interaction, and about the AAEE's involvement in facilitating this interaction, so that all those who are concerned with engineering education may appreciate the variety of problems the AAEE has endeavoured to address and confront.

This issue consists of four keynote addresses and the transcript of the Discussion Session and Open Forum, both held at the 3rd AAEE Annual Convention and Conference at The University of Adelaide in December 1991. During the Conference, members of the editorial committee expressed the view that the discussion, lead by four distinguished panelists should be recorded and reproduced in our Journal. Professor John B. Agnew, the Conference Chairman, has accepted the task of editing the papers and recorded discussion, so that they will be suitable for publication in a separate issue of the *AJEE*.

By giving our readers this special issue, we anticipate that it will become a useful source of information on topics concerning academia and industry. This Conference was a special opportunity for participants to confront the four panelists, representing industry, academia, government and the profession, with views that are of tremendous importance to the relationship between the parties involved. Readers will find these discussions extremely interesting and stimulating.

The *AJEE* is subsidised heavily by the AAEE with the objective that all members of the AAEE subscribe to it.

## NATIONAL ENGINEERING CONVENTION

### Australian Engineers - An Export Opportunity

The Institution of Engineers, Australia, is hosting the 1993 National Engineering Convention in Cairns, Far North Queensland, between 2 and 5 May. The Convention venue is the centrally-located Cairns International Hotel.

The Convention is planned around the theme *Australian Engineers - An Export Opportunity*. This theme reflects the increasing need for Australian engineers, in both the public and private sectors, to look outside Australia for opportunities to export professional skills, services and technology.

The Convention aims to provide the IEAust with an action statement relating to the theme. Interactive participation will be encouraged during the two-day technical program, with discussion results being presented at an Engineering Summit to be held on the third day.

The convention agenda will also include the National Young Engineers Australia Public Presentation Competition. Following the Convention a one-day workshop, *Regional Co-operation in Engineering Education*, will be conducted by the Federation of Engineering Institutions of South-East Asia and the Pacific (FEISEAP). The one-day workshop is being organised jointly by the engineering institutions which make up FEISEAP. The workshop program will address the following topics:

- \* Prospects for regional co-operation.
- \* Strengthening the interdependence of engineering courses in the region.
- \* Course accreditation by national engineering institutions.
- \* Establishing and maintaining appropriate levels of engineering competence.
- \* The role of national institutions in engineering education.



- \* Proposed regional accord on engineering education and qualifications, seeking an international acceptance of engineering qualifications.
- \* Advantages and disadvantages of studying engineering in more than one country within the region.

Although the AAEE has not been officially invited to become involved in the preparation for this workshop, we strongly recommend that AAEE members take an active part in this important event. Without wishing to sound too critical, this is not the first time that our *umbrella organisation* has overlooked the involvement of our society in its affairs concerning engineering education.

#### **AEESEAP/FEISEAP INTERNATIONAL CONFERENCE ON ENGINEERING EDUCATION '93**

The Faculty of Engineering at the National University of Singapore is currently preparing for a major conference on engineering education to be held in Singapore from 9 to 11 November, 1993.

The conference theme is *Future Trends and Challenges in Engineering Education*, with particular reference to issues concerning the South East Asian and Pacific region.

The chairman of the organising committee is Professor T.N. Goh, Dean of Engineering at the National University of Singapore. The Association for Engineering Education in South East Asia and the Pacific (AEESEAP) together with the Federation of Engineering Institutions in the South East Asia and the Pacific (FEISEAP) are major sponsors of the conference.

The first announcement and call for papers is being distributed. Authors are invited to indicate their interest in the Conference to the Conference Secretariat at the following address:

AEESEAP Conference  
c/o Applied Research Corporation  
Engineering Block E4 04-11  
National University of Singapore  
Kent Ridge Crescent, Singapore 0511  
Republic of Singapore

Tel: 65 775 5822, Fax: 65 773 0924

#### **2ND EAST-WEST CONGRESS ON ENGINEERING EDUCATION**

Preparations for the 2nd East-West Congress on Engineering Education, which will be held at the Technical University of Lodz, Poland, in September 1993, are well on the way. Close to 150 abstracts of proposed papers have been received, with over 200 expressions of interest in attending the Congress.

A special one-day seminar entitled *Improving Training Methodologies* will be held at Jagiellonian University of Cracow, Poland, on Monday September 27, 1993. Jagiellonian University provided the venue for the 1st East-West Congress on Engineering Education in 1991. The objective of this seminar is to discuss the outcomes of the 1st East-West Congress, and present new achievements relating to this important topic of engineering education.

Although the deadline for submitting abstracts has passed, especially interesting paper proposals from Australasian AAEE members will still be considered as they come in. Authors intending to submit late abstracts should forward them to the Newsletter Editor as soon as possible, preferably by fax.





*Picture above shows the Portsmouth Guildhall, situated adjacent to the University of Portsmouth. The Portsmouth Guildhall provided an excellent venue for the 3rd World Conference on Engineering Education.*

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For details of the Association and membership applications write to the Editor:

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