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AUSTRALASIAN ASSOCIATION FOR ENGINEERING EDUCATION

NEWSLETTER

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The picture above shows the Sydney University Electrical Engineering building, where the AAEE Headquarters were based. The Department of Electrical Engineering hosted the Association from its inception in 1989, until the end of 1993. On behalf of all AAEE members, the Executive Committee of AAEE expresses its sincere gratitude for all the support that the Association has received from SUEE staff members over the past five years.

AUSTRALASIAN ASSOCIATION FOR ENGINEERING EDUCATION

6TH ANNUAL CONVENTION AND CONFERENCE

INSPIRING INTEGRATION - FUTURES IN ENGINEERING EDUCATION IN AUSTRALASIA

AN INVITATION TO SUBMIT A PAPER AND TO ATTEND

Venue: University of Technology, Sydney

Dates: Sunday 11 to Wednesday 14 December 1994

Conference Chair: Professor Peter Parr

The AAEE Convention and Conference is proudly hosted by the Faculty of Engineering, University of Technology, Sydney (UTS). From 11 to 14 December 1994, at UTS University Hall and the Engineering Building, a strong congregation of industrialists, engineering educators and inspirational speakers will embrace the theme of:

Inspiring Integration - Futures in Engineering Education in Australasia

Professor Peter Parr, Dean of Engineering and Conference Chair says:

Perhaps societies always think great changes are upon them - and perhaps rightly so. Here and now, the changes are profound - in massive restructuring of industry; in government attitudes to education, privatisation and employment; in post-modern mistrust of technocracy and in the search for new community values; in burgeoning developments and expectations in many countries.

As educators, we must help to shape change, not just react to it. More than ever, we need to interact constructively with our constituents - students, employers, community. Engineering is about integrating knowledge and ideas from diverse sources and applying them to real outcomes. How can we bring this strength to bear on our own future directions?

AAEE 1994 will work to engage major interest groups, and particularly industry and community leaders in this urgent debate.

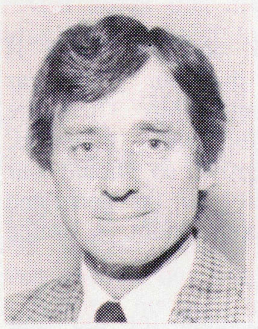
Associate Professor Stephen Johnston, Head of School of Mechanical Engineering, who is Conference Convener states:

Many of the current dilemmas, issues and challenges facing engineering educators and industry leaders will be addressed throughout the conference. We are looking to explore issues of concern to all stakeholders in the engineering arena, including students and the wider community.

The enthusiastic participation of strong schools of adult and vocational education at UTS will also help to make this conference a dynamic and exciting event.

For more information on the AAEE 1994 Conference, contact: Kate Fiddy, Executive Officer, Faculty of Engineering, University of Technology, Sydney, PO Box 123 Broadway, NSW 2007, Australia. Tel: +61 2 330 2603 and Fax: +61 2 330 2611, email:k.Fiddy@uts.edu.au

PRESIDENT'S REPORT - AAEE 1993



Prof. P. Darvall

With a memorable year to report, it is a pleasure to comment on the activities of the Australasian Association for Engineering Education; 1993 has been a year which has truly consolidated the Association's position.

The Association's focus this year has been wide, with the highlights being competency standards - a subject which raises many questions but answers few; the excellent Annual Convention and Conference in Auckland, New Zealand which, as in the past, recorded an increase of membership and activities; the 2nd East-West Congress in Poland, an indicator of future directions for the Association; the International Congress of Deans and Industry Leaders, at which we were pleased to see local leaders; a meeting with Russian delegates, which will result in important future plans; and, importantly, the UNESCO Supported International Centre for Engineering Education at Monash University, a truly significant milestone for our five-years-young AAEE.

The use of competency standards implies that a professional knowledge base is essential; that inputs of knowledge should be translated into proficiencies which provide the capacity for competent performance. These then are said to define a profession. During 1993, the IEAust achieved the first phase of the National Competency Standards (NCS) for Professional Engineers, that is stage 1 (graduate) and stage 2 (experienced level); the NCS lends itself, too, in new criteria for corporate membership of the IEAust. No doubt we will continue to see some stimulating debate on NCS in their entirety.

As a follow-up to two International Symposia for Engineering Deans and Industry Leaders, the International Congress of Engineering Deans and Industry Leaders, held in Paris in June, was memorable for its strong program and attendees. Topics were relevant, from developing university-industry cooperation for education and training, to the experiences of transferring technology. Two deans of engineering faculties in Australia were able to attend.

Poland in September was a delight. Surrounded by a wealth of history, the 2nd East-West Congress on Engineering Education held at the Technical University of Lodz was significant in that it and the earlier Congress have been largely the result of AAEE initiatives. Attending the 2nd East-West Congress was a group of Russian delegates who, on visiting Sydney, Canberra and Melbourne recently, met with Association representatives with the result being proposals for a series of collaborative projects. A copy of a Collaboration Agreement between The Australasian Association for Engineering Education and The Russian Association for Engineering Education is included in this issue of the AAEE Newsletter.

Our first Vice-President and Executive Director, now the Director of our UNESCO Supported International Centre for Engineering Education at Monash University, has worked tirelessly to build an international network of engineering educators, and as Foundation Dean at the Technical University of Lodz he is in a unique position to extend the cooperation even further. The initiative in this respect is a proposed quadrangular relationship between the University of Pavia in Italy, the University of Strathclyde in the UK, the Technical University of Lodz, Poland and Monash University in Australia.

International activities in 1993 which reflect the growing importance of AAEE included the Workshop on Engineering Education held in Cairns by the Federation of Engineering Institutions of South East Asia and the Pacific (FEISEAP), which I was asked to chair. Among FEISEAP's members are the PRC, Japan, Thailand, Australia, Hong Kong and New Zealand.

Most pleasing, too, for the future of the Association was the approach by organisers of the 3rd World Conference on Engineering Education for the Association's Australasian Journal of Engineering Education, volume 4, number 1, to be dedicated to papers from the Conference which was held in the UK in 1992. Guest editor for that issue was Professor Terance V.

Duggan, Dean of Engineering at the University of Portsmouth. Future issues are planned on similar lines. AJEE's volume 4, number 2, was a regular issue.

On Association organisational matters, the finances are particularly sound, and the future is assured. There were five Executive Committee meetings in 1993, with this our fifth year recording a healthy membership number of 501, in different grades of membership. There are three institutional members which represent 39 academics and 462 individual members, including over 100 from overseas. As the AAEE's international activities grow, so should our international membership base, and the focus of our activities. The publicity so far generated from our activities abroad continues to draw inquiries from overseas. Without doubt, a united and active Association builds a strong base.

The AAEE 5th Annual Convention and Conference was held in New Zealand for the first time, in the School of Engineering at the University of Auckland. Close to 180 individuals attended and more than 130 papers were presented at this extremely successful conference. It was pleasing that over 100 Australians crossed the Tasman Sea and contributed to the Conference. The theme was Aiming for Quality in Engineering Education, and among the invited speakers was Terry Duggan, winner of the 1992 AAEE Medal (International) for Distinguished Contributions to Engineering Education. Terry is well known for his support of radical change in engineering education. This year AAEE Medals were awarded to Professor Russel C. Jones (USA) and Professor David Elms (New Zealand). Their addresses will be published in the AAEE Journal.

The conference provided a forum for a much broader debate on topics and ideas relating to engineering education and industrial training. Many interesting opinions were aired and also registered in the Conference Proceedings which are of tremendous importance to the future of engineering education.

With such a memorable year behind us, I particularly wish to thank all AAEE members for the contributions which they have made to the Association in 1993. By taking an active part in the aspirations and achievements of the Association, you are improving engineering education and ensuring greater professional satisfaction for engineering educators.

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

SECRETARY/TREASURER'S REPORT

Membership has consolidated at just over 500 in the two grades of membership. The workload involved in maintaining records and the distribution of material to members including the Newsletter and Journal is extremely heavy. This is particularly so as the above positions are wholly voluntary.

A substantial financial outlay involves the preparation, printing and postage of our Newletters and Journals. Further, the visit by the Russian delegation during November 1993 was highly successful but cost the Association some $8,000. The IEAust was most generous, however, in providing $2,500 towards this activity. Also, the Faculty of Engineering at Monash University provided a similar amount of money to host the Russian delegation here in Melbourne. The delegation included the Russian Minister-Chairman of the Higher Education Committee of the Russian Federation and three other very senior Russian academics representing the Russian Association for Engineering Education.

The IEAust initiative in permitting members to pay their annual subscription to AAEE at the same time as paying their IEAust membership has been most successful with some 80% of members opting for this method of payment. This has greatly assisted the administration and financial procedures of the Association and our gratitude is extended to the IEAust administration for their assistance in this matter.

It is strongly recommended that all Association members who are also members of the IEAust adopt this method of payment during 1994. Non-IEAust members may still send their subscriptions direct to the Secretary/Treasurer of the Association.

The subscription for 1994 remains unchanged at $35 with IEAust members who nominate AAEE as their society of first choice paying $20, with IEAust providing a subvention of $15, making a total of $35.

Overall it has been a most successful year from both administration and financial aspects. The attached auditor's report indicates that our financial position is both strong and healthy even though our outgoings were slightly increased on our 1992 situation. The auditor's report is referred for your support and agreement.

May I thank you for your support and assistance on all matters relating to the administrative and financial arrangements of the Association.

Dr William N. Roebuck
EPM Consulting Group
Secretary/Treasurer of AAEE

A TRIBUTE TO SYDNEY UNIVERSITY ELECTRICAL ENGINEERING

The President of AAEE in his report gave an excellent overview of the activities carried out last year. However, not many AAEE members may realise that the AAEE is five years old. Feeling the joy and satisfaction from the fact that the Association has passed a most difficult and vulnerable period one should reflect upon the time when the whole idea of setting up the AAEE was conceived. Another reason for doing so is the fact that the Headquarters of the AAEE have now been transferred from the Department of Electrical Engineering at The University of Sydney to the Faculty of Engineering at Monash University, Clayton, Melbourne, Victoria.

At this point we wish to acknowledge the support we have received from the then Head of Department and now Professor Emeritus Hugo K. Messerle. Back in 1987 Professor Messerle had the courage to provide unequivocal support for the organisation of the 2nd World Conference on Engineering Education, as well as commit his time and financial resources to host, for the first time in Australia, such an important gathering of academics and industry leaders concerned about engineering education. Although preoccupied mostly with the task of being the Head of Department and the Conference Chairman, he was an active member of the team which assisted in the birth of our Association.

The past five years have seen tremendous support for the AAEE coming from the majority of the staff members of the Department of Electrical Engineering at The University of Sydney. Our Foundation President, Professor Trevor W. Cole spared no time or effort to make the Association a driving force and a forum for debate on issues relating to engineering and technology education. We should also recognise the support provided by members of the Electrical Engineering Education Research Group within the Department; Ross Hutton, Xin Li, Robert Wallace, and in particular Michael Rados, a quiet achiever. It will be hard to imagine that we can no longer ask Mike for help in running the Association affairs, designing computer programs and preparing AAEE publications. Mike has contributed many weekends to the Association. We salute you Mike.

On this important occasion, on behalf of the AAEE Executive Committee and, indeed myself, I wish to extend our sincere gratitude to our colleagues in the Department of Electrical Engineering at The University of Sydney for their support for the AAEE. I hope that in an era of electronic communication, the 900 kilometres or so between Melbourne and Sydney will not prevent them from providing further support and assistance in running the Association.

A BRIEF REVIEW OF ASSOCIATION ACTIVITIES IN 1993

The fifth year of operation of the AAEE has seen a number of important local and international activities. The Executive Committee met five times, which ensured the effective operation of the Association.

Four issues of the *AAEE Newsletter* were published with 56 pages of material on issues of importance for engineering education in general, and the Association in particular. The AAEE Newsletter facilitated the debate on competency standards in Australia so vigorously carried out by The Institution of Engineers, Australia. We have to mention with regret that the publication of only one issue was sponsored last year. The IEAust was the kind sponsor.

The *Australasian Journal of Engineering Education* published two issues which all together included 190 pages of material. The first issue (Vol.4, No.1) was a special issue and was entirely dedicated to the *3rd World Conference on Engineering Education* which was held at the University of Portsmouth under the leadership of Professor Terry Duggan. Professor Duggan was the guest editor of this issue. It includes a selection of keynote addresses which deal with a variety of topics relating to engineering education. The second issue (Vol.4, No.2) is a regular issue with ten articles. Again the proportion of articles included in the issue favours the Australasian authors. Papers by T.V. Duggan and B.E. Lloyd are expanded versions of the keynote addresses presented on the occasion of the award of the 1992 AAEE Medals for Distinguished Contributions to Engineering Education at the 4th AAEE Annual Convention and Conference held at The University of Queensland in Brisbane, in December 1992. It is worthwhile mentioning that the paper by Fiona Solomon was one of the awarded papers at the Conference in Brisbane.

The success of the 5th Annual Conference of the AAEE held at The University of Auckland was already mentioned in the President's report. At the 5th Annual Convention held this time on Monday, December 13, annual reports concerning the status of the AAEE were presented by the President, Professor Peter LeP Darvall and the Secretary/Treasurer, Dr William N. Roebuck (edited versions of the reports are included in this issue). The general meeting elected a new Executive Committee consisting of twelve individual members of the AAEE. At its first meeting, held after the Annual Convention, members of the Executive Committee elected the Executive Officers. The Executive Committee is:

President: Prof. Peter LeP Darvall, Monash University, Victoria, Australia.

1st Vice-President & Executive Director: Assoc. Prof. Zenon J. Pudlowski, Monash University, Victoria, Australia.

2nd Vice-President: Ms Elizabeth Taylor, University of Technology, Sydney, New South Wales, Australia.

3rd Vice-President: Prof. Roy M. Sharp, The University of Auckland, Auckland, New Zealand.

Secretary/Treasurer: Dr William N. Roebuck, EPM Consulting Group, Victoria, Australia.

Member: Prof. Trevor W. Cole, The University of Sydney, New South Wales, Australia.

Member: Mr Scott Grenquist, The University of Newcastle, New South Wales, Australia.

Member: Mr Gary E. Lane, Network Construction NSW, Telecom Australia, Sydney, New South Wales, Australia.

Member: Prof. Peter Parr, University of Technology, Sydney, New South Wales, Australia.

Member: Dr David F. Radcliffe, The University of Queensland, Queensland, Australia.

Member: Mr Ted Whitehead, The Institution of Engineers, Australia, Canberra, Australia.

Member: Mr Harry Wragge, Victoria, Australia.

AAEE MEDALS FOR DISTINGUISHED CONTRIBUTIONS TO ENGINEERING EDUCATION

For the third time the AAEE awarded its Medals for distinguished contributions to engineering education at the Annual Convention, this time in both divisions. The 1993 AAEE Medal (International) was presented for the second time, and Professor Russel C. Jones, University Research Professor at the University of Delaware, Newark, USA, a Vice-Chairman of the International Liaison Group on Engineering Education and a Co-Chairman of the UNESCO Steering Committee on Human Resources Development for Technical Industry Stimulation received this Medal. Presenting the solid sterling silver medal the AAEE President, Professor Peter Darvall, read the following citation:

The 1993 Medal of the Australasian Association for Engineering Education (International) is awarded to Professor Russel C. Jones.

Russel C. Jones is University Research Professor at the University of Delaware, USA. He has spent his career as an educator, starting with engineering education and broadening to higher education as a whole. He has been particularly active in building collaborative programs between universities and the business and industry constituencies which they serve. Dr Jones received his own education at Carnegie Institute of Technology, earning degrees in civil engineering and materials science.

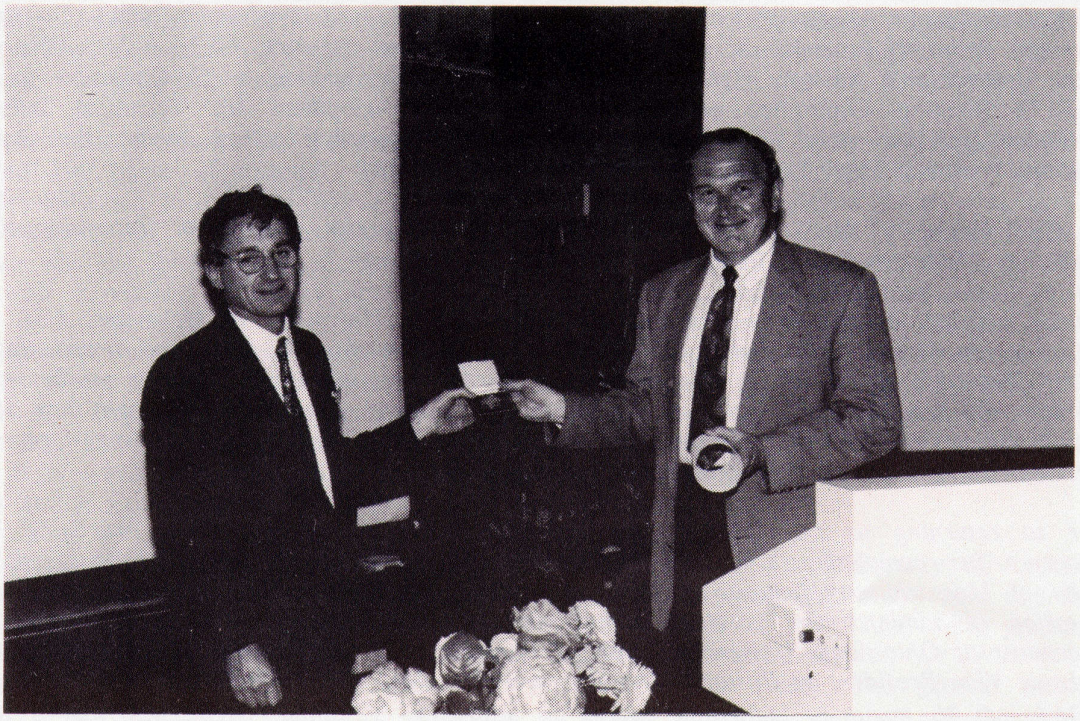
Prior to returning to Carnegie for his doctoral study, he worked as a practising civil engineer. After completing his doctoral degree in 1963, he taught for eight years on the faculty of Massachusetts Institute of Technology, in Civil Engineering. He then served in a succession of administrative posts in higher education: Chairman of the Civil Engineering Department at Ohio State University, Dean of Engineering at the University of Massachusetts, Academic Vice President at Boston University, and President of the University of Delaware.

Since 1988 he has been University Research Professor at the University of Delaware. Long active in the engineering profession, Dr Jones has served as a national officer of the American Society for Engineering Education and the American Association of Engineering Societies, and has served as President of the Accreditation Board for Engineering and Technology. He was general chairman for UPADI '90, the biannual meeting of the Pan American Association of Engineering Societies. In higher education more broadly, Dr Jones has been concerned with developing technological literacy in non-technical students, with the quality of campus life for students, and with interactions between universities and pre-college education. He has recently served as a Senior Fellow of the American Council on Education.

Dr Jones has been heavily involved in the international aspects of engineering practice and engineering education for many years. While a faculty member at MIT early in his career, he participated heavily in the Inter-American Program in civil engineering, a faculty development and exchange program with several major universities in Latin American countries. While Vice President at Boston University and President at the University of Delaware, he travelled extensively in the Far East, building joint educational programs between his institution and organisations in Japan, Taiwan, Mainland China, and Hong Kong. He has participated in several international conferences sponsored by UPADI (The Pan American Association of Engineering Societies), and in 1990 was General Chairman of the biannual UPADI conference held in Washington, DC - the first such meeting hosted by American engineers in two decades. While President of ABET, Professor Jones provided leadership in the development of educational equivalency agreements among the six English speaking countries - the Washington Accord *- and between the United States and FEANI in the European Community. In the summer of 1991 he co-chaired a major international conference on engineering education, held at UNESCO headquarters in Paris.*

As an ongoing effort stimulated by that conference, he currently serves as co-chair of the

UNESCO Steering Committee for Human Resources Development for Technical Industry Stimulation, an action oriented group focussing on the enhancement of engineering education in developing countries. His major current interests in the international arena include preparation of engineering graduates for effective practice in an era of intense international competitiveness, and appropriate adjustments to restrictions of engineering practice across country borders. In addition to being a registered professional engineer in four states in the United States, Dr Jones is registered as a Euro-engineer with FEANI.



Prof. Russel C. Jones receives the 1993 AAEE Medal (International) from the AAEE President, Prof. Peter LeP Darvall.

The AAEE 3rd Vice-President and the President of the Association for Engineering Education in South East Asia and the Pacific, Professor David G. Elms of the School of Engineering at the University of Canterbury, Christchurch, New Zealand, was the recipient of the 1993 AAEE Medal (Australasia). In recognition of his oustanding contributions to engineering education the AAEE President presented the following citation:

The 1993 Medal of the Australasian Association for Engineering Education (Australia) is awarded to Professor David G. Elms.

During his years in the Civil Engineering Department of the University of Canterbury, David Elms has made a number of significant contributions both in research and in the field of engineering education. His research work has been broad-based. He has spread his activities among a number of fields, which is appropriate as his general approach has been one of integrating ideas and disciplines together to bring a fresh view to the topics with which he has been involved. In the main, his research has concentrated on the areas of geomechanics, systems decision-making and risk analysis. In geomechanics, the work he did on the seismic behaviour of retaining walls with Rowland Richards led to a novel design method which is widely used internationally and has come to be called the Richards-Elms method. Another useful contribution produced by the collaboration of the two is the concept and understanding of fluidized soil behaviour.

In systems methodology, David Elms's paper From a structure to a tree *has often been cited, as has a contribution to model optimization he wryly called* The Principle of Consistent Crudeness. *In New Zealand he is perhaps best known for his work in risk assessment.*

A number of his papers have been concerned with risk-based approaches to code optimisation, including both structural and fire codes. He made major contributions to the recent McGraw-Hill book Engineering Safety, and in 1992 he was a member of the Prime Minister's Special Committee investigating the safety of nuclear powered ships. His administrative contributions to the School of Engineering at the University of Canterbury have been considerable. He served as Dean for four years, he chaired the organising committee for the School's centennial celebrations, becoming responsible for impetus leading to the successful Centre for Advanced Engineering, and he played a major part in founding the annual Hopkins Lecture.

His interest in engineering education has particularly focused on developing courses aimed at teaching versatile problem-solving and analytic skills for handling complex systems. For many years his ideas were not widely recognised and he felt something of a lone voice. Now, however, there is a greatly increased interest in wisdom engineering, *as he sometimes calls it, because many modern engineering problems occur at the complex interfaces between technical matters and the natural or social environments. The current interest comes from both educationalists and industry.*

Professor David Elms is presented with the 1993 AAEE Medal (Australasia) by the AAEE President, Prof. Peter LeP Darvall.

Environmental engineering and risk management are two specific areas where his ideas are proving fruitful. He was an early advocate of the idea that engineering academics should be professional educators as well as engineers, and that therefore engineering education was a discipline just as worthy of academic attention in its own right as the disciplines of professional engineering. He therefore put his weight behind various engineering education organisations. He has strongly supported the Association for Engineering Education of Southeast Asia and the Pacific, and is currently its president. He chaired the organising committee for the 1991 AEESEAP Conference in Christchurch, and has been the moving force behind the formation of the IPENZ Engineering Education Technical Group, which intends merging with AAEE at its Conference in December.

He has supported AAEE from its inception, believing that Australia and New Zealand have many common interests in engineering education, and urgently need a forum for sharing ideas and experiences. He has also practised what he has advocated, for over a number of years he has written extensively on engineering education. His ideas and enthusiasm have been a significant contribution, particularly in New Zealand, to the present coming of age of

engineering education as a worthy discipline in its own right.

According to our *tradition* both recipients of the 1993 AAEE Medals presented keynote addresses. It is anticipated that the addresses will be submitted for publication in the *Australasian Journal of Engineering Education.* The AAEE Executive Committee wishes to continue the award of the AAEE Medals in 1994.

A call for nominations

The AAEE Medal for Distinguished Contributions to Engineering Education was established in 1991 with its Australasian division. Z.J. Pudlowski was the recipient of the Inaugural Medal. In addition to the Australasian division in 1992 the AAEE Medal was extended into the international arena by introducing its International division.

The recipients of these sterling silver medals will be invited to give keynote addresses at the forthcoming 6th Annual Convention and Conference on an aspect of their interests and work in engineering education. Also, the medallists will be invited to submit their addresses for publication in the *Australasian Journal of Engineering Education.*

The purpose of these AAEE Medals is to recognise outstanding contributions to engineering education, both in Australasia and overseas. Such contribution will be identified by books, research papers, reports, journal and conference publications, engagements and achievements in activities carried out by engineering education organisations, etc.

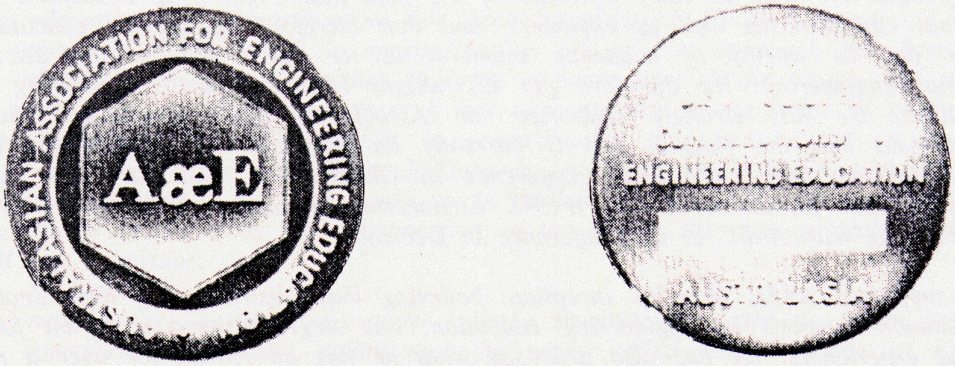
Only members of the AAEE are eligible to nominate candidates for the award of these AAEE Medals. To be eligible for the award of an AAEE Medal (Australasia), a candidate must be a member of the Australasian Association for Engineering Education and his or her research and other activities must have been carried out in Australasia.

Nominations are hereby invited. They should include a comprehensive statement by a proposer(s), and should include a curriculum vitae, a list of publications, relevant samples of publications, and a thorough evaluation of the candidate's work and achievements carried out by the proposer(s). Nominations which are incomplete by the closing date will not be considered. The Executive Committee of the AAEE reserves the right not to proceed with the award of medal(s) and/or to nominate its own candidate(s) at a meeting of the Executive.

Nominations are confidential and should be addressed to:

Professor Peter LeP Darvall
AAEE President
Faculty of Engineering
Monash University, Clayton, VIC 3168
Australia

The deadline for nominations is 31 July 1994.



Picture above shows the AAEE Australasian Medal (actual size).

CROSSING BOUNDARIES IN ENGINEERING EDUCATION*

Dr Terry Berreen

Introduction

Engineering education in Australia should no longer be seen as limited to study in a specific engineering department in a Faculty of Engineering. Rather, with the availability of double degree programs, a student is able to cross faculty boundaries and combine engineering with disciplines from other faculties. This article highlights, in particular, the double degree programs combining engineering with commerce, engineering with law and engineering with arts. As well as the crossing of faculty boundaries, reference is also made to examples of the crossing of physical and cultural boundaries in engineering education.

Double degree programs

Double degree programs involving engineering are developed for a number of reasons. There is an obvious value in having engineering graduates with expertise in another discipline. For example, having engineers with commerce, economics and business degrees in the top management of engineering companies or having engineers skilled in law or particular languages. In similar vein, Monash University has moved to introduce a double degree program combining law and medicine. This MBBS/LLB program, structured over seven years, is considered the first such program in Australasia or Great Britain.

The introduction of these enterprising and challenging programs can attract into engineering higher calibre students, who otherwise may not have studied engineering. Alternatively, these programs may attract a particular group of students into engineering, as for example attracting women by an engineering/arts program. From a student viewpoint, these programs are seen as a means of improving employment opportunities, especially in a time of high unemployment.

Science and Engineering - BSc/BE

The double degree in science and engineering, BSc/BE, was the first double degree program involving engineering to be introduced at Monash University and aimed at producing engineering graduates with a greater scientific knowledge or acquainting scientists with the art of bridging the gap between theoretical modelling and practical application. These BSc/BE programs were introduced at Monash in the early 1980's and by 1990 were offered by all engineering departments (Chemical, Civil, Electrical and Computer Systems, Materials and Mechanical).

Entry to this program is at first year with the score for entry being generally greater by about 10% than that required for entry to BE alone. The 5-year BSc/BE consecutive program qualifies the student for the BSc after three years of successful study of an approved combination of science and engineering subjects and for the BE after a further two year's study in engineering. The 1993 Survey of Engineering Education in Australasia by Scott Grenquist showed that out of the 33 engineering schools replying to the survey, 11 had double degree programs combining science with engineering.

Engineering and Commerce - BE/BCom

The double degree in engineering and economics, BE/BEc, was introduced at Monash by the Department of Civil Engineering in 1985 following negotiations with the Faculty of Economics and Politics in 1983. The introduction of this double degree program was in response to what was seen as the changing nature of the Civil Engineering profession in Australia from one primarily oriented towards design and construction to one equally oriented to the management and operation of large engineering systems creating a demand for civil engineers with a greater knowledge of economics, administration, and management than was available in the existing engineering course. The Department of Mechanical Engineering, for similar reasons, introduced a BE/BEc program in 1987 as many graduates in mechanical

engineering were moving into administration and management, either in large companies or were involved in setting up their own companies. The Department of Chemical Engineering and the Department of Materials Engineering eventually set up the BE/BEc degree program.

In 1992 the BE/BEc program was changed to engineering/commerce, BE/BCom, to allow a wider choice of subjects and particularly the possibility of a major in management, considered to be most relevant for engineers.

The 1993 Survey of Engineering Education in Australasia lists that 8 of the 33 engineering schools offer double degree programs combining engineering with one of commerce or business. There is also a double degree program introduced by the School Of Manufacturing and Mechanical Engineering at the University of South Australia which combines a degree of Bachelor of Engineering with a Master of Commerce in Manufacturing Management and Automation.

The Monash BE/BCom program is entered at the commencement of second year. Entry is competitive and requires an average, from first year, of about credit level (65%). The next four years of the five year program are integrated between the two Faculties and the two degrees are obtained simultaneously on completing the program. The engineering content is fairly fixed of compulsory subjects with some selection of elective subjects and a thesis project in the final year. The commerce content is more selective than the engineering content, reflecting the nature of the BCom degree where, except for a number of compulsory subjects in the early years, the student can select a specialisation from a large range of subjects.

Engineering and Law - BE/LLB

The BE/LLB double degree program was first introduced by the Department of Mechanical Engineering and the Faculty of Law at Monash University in 1985. Various laws, both common and statute law, in Australia have an impact on the engineering profession so that it is important for the engineering profession to have more of its members legally qualified. Equally, there are benefits in having lawyers with engineering qualifications. Other engineering Departments, except Electrical and Computer Systems, later introduced BE/LLB programs at Monash. According to the 1993 Survey, the BE/LLB program is only available otherwise in Civil Engineering at the University of New South Wales and in Chemical Engineering at the University of Adelaide.

The BE/LLB program at Monash is also entered at the second year of engineering and requires an average mark between high credit and distinction (70% to 75%). Students in this program then take one law subject in each of second and third year and two law subjects in their fourth year. At the end of their fourth year the BE degree is obtained and after two more years study, in the Faculty of Law, the LLB is obtained, so this is a consecutive double degree program.

Engineering students are required to complete a thesis project in their final year, this project forming a major part of the final year's assessment. Where supervision is available, a number of students in the BE/LLB program in Mechanical Engineering at Monash have taken on an engineering/law related project. Examples of such projects are:-

* intellectual property and the engineer;
* the impact of anti-competitive laws on the manufacturing industry;
* a guide to product liability for engineers;
* professional negligence.

Engineering and Arts - BE/BA

The engineering/arts program was introduced at Monash in 1989 to enable students, in view of the internationalisation of engineering projects, to pursue interests in engineering and languages concurrently. It has now been extended to allow students to complete any arts major and minor sequence. Thus, engineering students can pursue an interest in areas such as

sociology, history, philosophy, Asian studies and psychology. The simultaneous BE/BA program is entered at first year and can be completed in five years although timetabling difficulties can inhibit this.

Accreditation

It is important in developing any double degree program that the degrees involved satisfy the requirements for professional recognition by the respective professional bodies. For engineering degrees, accreditation for undergraduate professional courses in Australia is given by The Institution of Engineers, Australia, through their Accreditation Board. Difficulty could be encountered with double degree programs because there is almost certainly a reduction in engineering content to ensure that the program is completed with some reasonable reduction in time to that if the two degrees had been taken consecutively and independently. For example, in the BE/LLB program in the Department of Mechanical Engineering at Monash University a student will take 158 credit points of engineering compared with 178 credit points in the BE program. For this reason, accreditation was given to the engineering component of this double degree program with the warning that the engineering content ought not to be reduced any further.

Numbers in double degree programs at Monash

Numbers in these double degree programs at Monash University in the years 1989 to 1993 are given in the following table. These figures show that approximately 35% of engineering students are taking double degree programs.

	1989	1990	1991	1992	1993
BE/BEc-BE/BCom	66	65	67	76	81
BE/LLB	17	17	24	26	29
BSc/BE	372	406	421	405	395
BA/BE	8	31	57	79	94
BE	961	1058	1156	1140	1126

In 1993, the top student and six of the top ten students in civil engineering were students taking the BE/BEc program.

Crossing physical and cultural boundaries in Engineering Education

The crossing of physical and cultural boundaries in engineering education is well entrenched and developing, as for example with East-West Congresses on Engineering Education, activities of AEESEAP and FEISEAP, and the many activities of AAEE, to mention but a few. The number of international students in engineering faculties across Australasia and the movement of Australasian engineering students to Europe and European engineering students to Australasia on organised work programs and exchange further illustrate the crossing of these boundaries.

Clearly the most recent and exciting example of potential in the crossing of physical and cultural boundaries in engineering education is the establishment of the UNESCO Supported International Centre for Engineering Education (USICEE) in the Faculty of Engineering at Monash University.

Conclusion

The crossing of various boundaries in engineering education raises challenges for us as engineering educators and in particular should excite and challenge our students at a time when we must attract the most capable students into engineering and when there is difficulty in ensuring the full employment of engineering graduates.

* Taken, in part, from a paper to be delivered at the International Conference on

Development and Interaction of Economy, Science and Technology, and Law (ICDI '94), Beijing, China, May 1994.

* The author holds degrees in education, engineering and law.

Dr Terry Berreen
Department of Mechanical Engineering
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A CALL FOR RENEWAL OF MEMBERSHIP

At the 5th Annual General Meeting the Executive Committee did not seek to increase membership fees, and it was decided that membership fees for 1994 remain the same as they were in 1993. Association members are kindly asked to renew their membership, and to encourage their colleagues who are not members of the AAEE to join our Association. Although fees are payable by June 30 each year, we would appreciate it if members would pay their dues as soon as possible so that we may more effectively plan the 1993 budget. AAEE members who are corporate members of the IEAust are encouraged to renew their AAEE 1994 membership through the IEAust, using the IEAust's 1994 Subscription Form.

A call for renewal of membership is therefore made and a single-page reminder is included in this issue for those who are not members of the IEAust.

RUSSIAN DELEGATION ON ENGINEERING EDUCATION VISITS AUSTRALIA

A delegation representing the Russian Association for Engineering Education (RAEE) visited Sydney, Canberra and Melbourne last November. Members of the delegation included Dr Vladimir G. Kinelev, Minister-Chairman of the Russian Federation Committee on Higher Education, Dr Boris S. Mitin, President of the Russian Association for Engineering Education and Rector of the Moscow State University of Aircraft Technology, Dr Alexei F. Nesterov, General Director of the Association for Engineering Education of Russia and Dr Victor P. Savinykh, pilot-cosmonaut of the USSR, President of the Association of Educational Institutions of Russia and Rector of Moscow State University of Geodesy and Cartography.

The visit was basically a follow-up of the contacts established at the 2nd East-West Congress on Engineering Education, held at the Technical University of Lodz, Poland, last September. The objectives of the visit to Australia were discussed thoroughly in Lodz, and the visit itself was well planned. The only problem was that because of several commitments in Russia, Minister Kinelev was able to spend only a week on Australian soil.

In the first week the delegation visited the Headquarters of The Institution of Engineers, Australia, where they were hosted by the IEAust President, Dr Brian Lloyd and the IEAust Director Education, Mr Ted Whitehead. Most of the discussions concentrated on issues relating to accreditation and recognition of foreign qualifications. Course accreditation is a hot topic for new and developing democracies. With the wave of migration, as well as the mobility of staff in Europe and beyond, many countries in Central and Eastern Europe want to learn more about the existing systems of accreditation of engineering courses and the methods for recognition of foreign qualifications.

Areas of common interest for both parties, such as technology transfer, engineering management, competency standards, continuing engineering education, as well as the improvement of undergraduate teaching, were also high on the agenda. Both parties have expressed the desire to continue discussions in the future.

The AAEE Executive Committee officially met members of the RAEE Executive Committee on two occasions. Extensive debate on issues of common interest took place in the Dean of Engineering conference room at Monash University on Friday, 19 November 1993. Both delegations exchanged their views on issues of importance for engineering education in their countries, painting an honest picture about the strengths and weaknesses of their education systems. Subsequently, both parties indicated the most important topics for discussion. The

Collaboration Agreement between
The Australasian Association for Engineering Education and
The Russian Association for Engineering Education

Following discussions in Australia between representatives of the Russian Association for Engineering Education (RAEE) and of the Australasian Association for Engineering Education (AAEE), 16 - 28 November 1993, agreement has been reached that both Associations will co-operate towards the following actions:-

1. The AAEE and the RAEE will exchange information and experience in order to maximise the potential of both Associations, including the exchange of academics, students and industry managers.

2. Strong support will be given to the following engineering education conferences to be held in Russia:

   - International UNESCO Conference on Engineering Education - 1996
   - Fourth East-West Congress on Engineering Education - 1997
   - Fifth World Conference on Engineering Education - 1998.

3. AAEE and the UNESCO Centre will provide practical assistance to RAEE in areas of its management, publications, advertising, and publicity with funds to be provided through sponsorship.

4. A sub-centre of the Monash UNESCO Supported International Centre for Engineering Education may be established in Moscow or St Petersburg with support of AAEE and the UNESCO Centre and subject to financial support of the Russian Ministry of Education.

5. Australian engineering educators will travel to Russia to give courses on engineering education for academic teachers. Subject to finance from the Russian Ministry of Education, selected English-speaking Russian academics would visit Australia for training to assist in these courses.

6. AAEE will facilitate the delivery in Russia of specialist courses to develop engineering managers. AAEE will identify suitably qualified lecturers and high quality teaching material while funding will be provided by Russian organisations.

7. A delegation of AAEE executive members will visit Russia during June or July 1994 with the intention of further exchanges of experiences and ideas and to foster enhanced collaboration in engineering education.

for Professor Peter LeP Darvall
President of AAEE

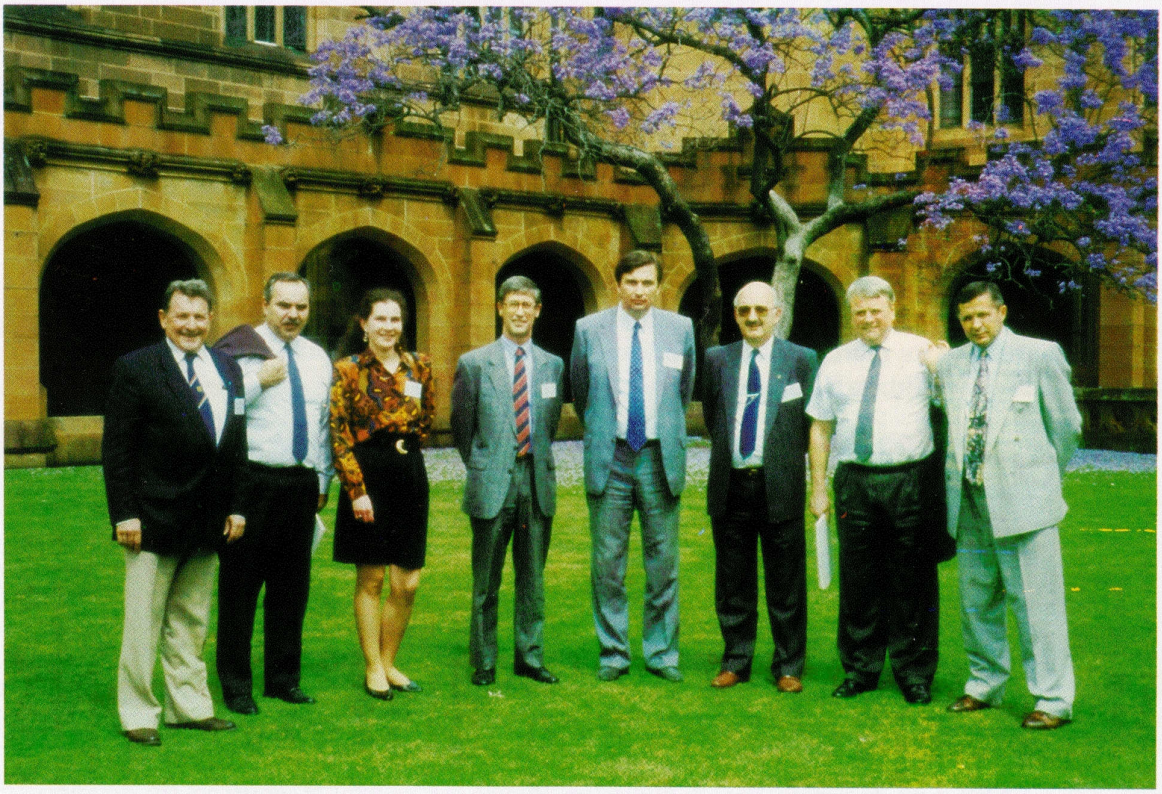
Professor Boris S Mitin
President of RAEE

26 November 1993

26.11.93

topics included the possibility of delivery of accreditation courses in Russia, facilitated by the IEAust.; the establishment of a sub-centre of the UNESCO Supported International Centre for Engineering Education in Russia, with the support of the Russian Ministry of Higher Education; the delivery of specialised courses in engineering management and courses for academic teachers, and the collaboration in organising meetings and conferences on engineering education, higher education and information technology.

The discussions led to the conclusion that a joint AAEE and RAEE communique be prepared, detailing specific areas of interest which would form an agreement on joint collaboration. A one-page agreement on collaboration between the AAEE and the RAEE was prepared and signed by chairmen of both parties. A copy of the document is included in this issue. AAEE members are invited to provide comments and suggestions concerning this document.



Above: Members of the AAEE and RAEE at the main quadrangle of The University of Sydney. Standing are (l-r) Dr W.N. Roebuck, Dr A.F. Nesterov, Ms G.E. Khramtseva (interpreter), Prof. T.W. Cole, Dr V.G. Kinelev, Dr Z.J. Pudlowski, Dr B.S. Mitin and Dr V.P. Savinykh.

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

Associate Professor Zenon J. Pudlowski, Faculty of Engineering, Monash University, Wellington Road, Clayton, Melbourne, VIC 3168, Australia, Tel. (03) 905 4977, Fax: (03) 905 6069

Association members and tertiary institutions are invited to contribute to the Newsletter on matters relating to membership and engineering education.

Send contributions to the Editor at the address above.