Department of Civil Engineering
Clayton and Caulfield Campus

Annual Report

2000

MONASH
UNIVERSITY
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1. Introduction And Objectives

The Year 2000 saw the Department of Civil Engineering expand its activities in research, teaching and professional services. The Department continued to provide a high level of teaching provision and research output while positioning itself for future change. Its mission is "To provide high quality Civil Engineering education, research and professional services globally for the mutual benefit of the students, the staff, the University, industry, the profession and the wider community".

Undergraduate Teaching

The Department continues to develop its new undergraduate program. The Department commenced its new Level 2 subjects in 1999. The subjects are given in a problem-based learning mode and represent a learning experience for both students and academic staff. The subjects involve larger and more integrated projects and groupwork. More attention needs to be given to the development of group dynamic skills for students. New level 3 subjects were developed for presentation in 2000. The development of the associated courseware is allowing greater flexibility of learning and presentation of the course.

Postgraduate Education Programs

The Institute of Transport Studies within the department has developed a distance education postgraduate program in transport studies. The program involves industry courses, Graduate Certificates, Postgraduate Diplomas and Masters degrees (coursework only) in transport and traffic. It is possible to articulate from industry courses upward through to the Masters degree. All subjects will be offered by distance education.

Industry Education Programs

The Institute of Transport Studies still maintains its activities in the Bus and Coach and Parking industries. The programs have attracted considerable student support. Industry is involved in the ongoing development of the program.

The Water group has developed and offers a series of technology transfer programs to industry. These are well received and have provided training to over 50 students.

The Geomechanics group has developed and offers short courses in Environmental Geomechanics.
Research

Strong research activities have continued in the key departmental strengths of structural, water, geomechanics and transport engineering. One hundred and fourteen research projects have provided the focus for staff during 2000. Research funding support of $518,000 has been attracted to support these projects. The Department has 41 PhD and 22 MEngSc students.

Staff members were involved in the preparation of 5 books, 1 book chapter, 33 journal articles, 56 conference papers and 6 research reports. Seven PhD and nine Master of Engineering Science theses were completed in 2000. Staff attended 52 conferences. Staff, research students and visitors presented 25 seminars on their research and activities during the Departmental seminar series.

Visitors and Visits

The Department hosted 25 visitors from all parts of the world. These visitors worked closely with departmental staff to develop research and teaching activities. The linkages developed between staff and these visitors ensure the maintenance of high standards of research and teaching as well as the strengthening of links between the department and other universities throughout the world. Departmental staff visited 17 institutions in 2000.

External Activities

Staff members were involved in the review of paper and journal editorial committees on 51 occasions and presented 21 seminars at other institutions. They were also involved in 19 consulting contracts and 42 professional associations.

Centres

The Cooperative Research (CRC) for Catchment Hydrology is headquartered at Monash University, with Professor Russell Mein as its full-time Director. This CRC brings together, in a cooperative venture, three research and eight user organisations from Victoria, Queensland and NSW. All of the water-related academic staff in the Department was involved in the Centre, mainly in its Urban and Flood Hydrology Programs.

The CRC was successful in its bid for a further seven years of funding under the Commonwealth CRC Program last year, with an expanded Centre (four research and ten user Parties from Queensland, NSW, and Victoria). Again the Water staff are involved in Centre Programs, notably Urban Stormwater Quality (with Associate Professor Wong as Program Leader), Sustainable Water Allocation, and River Restoration Programs. The Centre is, again, expected to attract a significant number of post-graduate students.

The Institute of Transport Studies has developed its teaching activities rapidly in 2000. The introduction of a distance education program for the Bus and Coach industry has resulted in attracting over 500 students. The Parking Education program continues to attract students.

The Institute of Transport Studies has increased its research student base and has focused on research in Intelligent Transport Systems area.
Staff Profile Management

The Department of Civil Engineering has continued to increase its staffing through the centres it is associated with and external research funding. Staffing from traditional government funds have decreased during 2000.

2. Current Departmental Structure

In 2000, the Department operated through four sections: Geomechanics, Structures, Transport and Water, headed respectively by Dr J. Seidel, Dr R. Al-Mahaidi, Dr G. Rose, Assoc. Prof. T. Wong.

The Management Committee consisted of Prof W. Young (Chair), A/Prof C. Haberfield (Deputy Head of Department and Director of Research, Semester 1), Dr X.L. Zhao (Director of Research, Semester 2), A/Prof G. Codner (Deputy Head of Department, Semester 2; Director of Teaching), A/Prof R. Grzebieta (Director of External Affairs), Mr C.D. Powell (Director of Support Services).

Current Staff Numbers:

<table>
<thead>
<tr>
<th>Number of academic teaching staff: 22</th>
<th>Number of technical staff: 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associates of Department: 8</td>
<td>Number of secretarial/admin. Staff: 11</td>
</tr>
<tr>
<td></td>
<td>Number of research assistants* 6</td>
</tr>
<tr>
<td></td>
<td>* appointment not necessarily for whole year</td>
</tr>
</tbody>
</table>

Staff Changes:

New appointments:
Dr Wei Dong Guo, Logan Research Fellow
Dr Roger Zou, Research Fellow
Mr John Clements (Program Director, ITS)
Dr Tim Fletcher (Research Scientist CRCCH)
Ms Astrid de Alwis (Assistant Lecturer)

Resignations:
Ms Samantha Taylor, Lecturer
Mrs Christine Gomez, Secretary to Professor
Ms Yvonne Correlje, Program Director (ITS)
Mrs Elizabeth Jeffreys, Manager New Products
Dr C.Q. Li, Senior Lecturer

Promotions:
Dr Raphael Grzebieta (from Senior Lecturer to Associate Professor)

Retirements:
Nil
List of Staff:

Head of Department  
Professor William Young BE (Hons) N.S.W. MSc PhD GradDipMgt Deakin MBA Deakin FIEAust FITE FCIT CPEng

Professors  
Paul Grundy BCE(Hons) MEngSc Melb. PhD Cantab. FIEAust MISOPe CPEng  
Russell Gordon Mein BAgriE(Hons) MEngSc Melb. PhD Minnr. FIEAust  
William Young BE (Hons) N.S.W. MSc PhD GradDipMgt Deakin MBA Deakin FIEAust FITE FCIT CPEng

Emeritus Professors  
Eric Marwick Laurensen BE (Hons) PhD N.S.W., CPEng, FIEAust  
Noel William Murray† BE(Hons) Adel. PhD Munch. DrIngEL FIEAust MICE MISStructE FTS

Adjunct Professors  
Kenneth Wade Ogden BE (Hons) MEngSc Melb. DipCE Ballarat School of Mines PhD MITE FIEAust CPEng  
Rahmi Akcelik MSc Istanbul Technology University PhD Leeds

Associate Professors  
Gary Peter Codner DipCE Caulfield I.T. BE (Hons) MBA PhD FIEAust  
Chris Michael Haberfield BSc BE (Hons) Syd. PhD MIEAust CPEng  
Robert John Keller BE (Hons) PhD Cant. MASCE MIEAust MIPENZ  
Henry Robert Milner BE MEngSc Qld. PhD Lond. FIEAust. CPEng NPER AIWSC  
Tony Hoong Fatt Wong BE PhD CPEng MIEAust MASCE  
Raphael Hilary Grzebieta MgrInz (Hons) T.U. Cracow PhD MIEAust CPEng NPER MSAEA, MSAE

Senior lecturers  
Riadh Al-Mahaidi BSc (Civil Eng) (Hons) Baghdad MSc PhD C'neil MIEAust MASCE CPEng  
Abdelmalek Bouazza Civing Algiers PhD Glas.  
Roger George Hadgraft BE (Hons) MEngSc James Cook DipCompSc Qld PhD  
Geoffrey Rose BE (Hons) Queensland I.T. MSc PhD Northwestern MIEAust  
Jay G Sanjayan BSc(Eng) (Hons) S. Lanka PhD MIEAust  
Julian Peter Seidel BE (Hons) PhD MIEAust CPEng  
Geoffrey Robert Taplin BE(Hons) Tas. MEngSc PhD CPEng NPR MICE MISTRuctE MIEAust  
Peter Erwin Weinmann Diplng ETH (Zurich) MEngSc MIEAust CPEng  
Bill Man-Blu Wong BSc (Eng) Lond. PhD N.S.W. CEng MICE, MIEAust, CPEng  
Xiao-Ling Zhao PhD Syd. ME Shanghai Jiao-Tong MASCE MIEAust CPEng MCCES

Lecturers  
Keith Harry McKeney BE MEngSc Melb. CPEng MIEAust  
Jagoda Williams BE MEngSc Warsaw PhD Polish Acad. Sci. MASCE  
Richard Murray Wootton BE Melb. DipCE Caulfield I.T. MEngSc TTTC  
John Clements B.Com(Hons) Dipl.Ed Melb. M.Ec. MAdmin FCIT

Assistant Lecturer  
Astrid de Alwis BA(MU) GDipT&DMgt(RMITU) MCIT
Research Staff
Wei Dong Guo BE (Hons) Hohai MengSc Xi'an PhD UWA
Roger Zou PhD Tas.

Associates of the Department
Ian Boyd Donald BCE (Hons) MEngSc Melb. PhD DIC Lond. MIEAust
Alan Holgate BSc (Hons) Lond. PhD MICE MIEAust
Stuart Martin Cannon BSc (Hons) Plymouth UK MSc Cranfield PhD Brun. CEng UK
MRINA MSNAME
Geoffrey William Smith DipCE R.M.I.T. BE MEngSc Melb. CPEng FIEAust AIWSc
Barbara Ozarska MWood Tech PhD Poznan
Zuyu Chen BE Tsinghua PhD Tsinghua
Frank Collins BE Syd MengSc Syd PhD

Administrative staff
Chris Powell (Director, Support Services)
Helen Parker (Administrative Assistant, Support Services)
Noi Souvandy (Administrative Assistant, Support Services)
Jenny Manson (Postgraduate Studies Administration Officer)
Irene Sgouras (Undergraduate Studies Administration Officer)
Elizabeth Jeffreys (Manager, Courseware and Distance Education)
Yvonne Correlje (Program Director, ITS)
Brenda O'Keefe (Manager, ITS Administration)
Dominique Thomson (Administrative Assistant to the Head of Department)
Virginia Verrelli (Administrative Assistant, CRCCH, 80%)
Maieve O'Leary (Administrative Assistant, CRCCH, 20%)
Christine Gomez (Administrative Assistant to Professor)

Technical staff
Graham Rundle
Wally Richter
Carl Bakes
Rob Alexander
Andrew Haines
Roger Doulis
Peter Dunbar
Jeff Doddrell
Roy Goswell
Michael Leach
Don McCarthy
Anthony Nixon
Alan Taylor
Frank Winston
Len Doddrell
Godwin Vaz
## Visitors to the Department:

<table>
<thead>
<tr>
<th>Name</th>
<th>Contact Details</th>
<th>Staff Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Sofia Alljahbana</td>
<td>Head, Department of Civil Engineering, Tarumanagara University, Jakarta (Indonesia)</td>
<td>Dr. Xiao-Ling Zhao</td>
</tr>
<tr>
<td>Dr. Esmaeel Ayati</td>
<td>Engineering College, Ferdowsi University of Mashad, Mashad (Iran)</td>
<td>Professor William Young</td>
</tr>
<tr>
<td>Ms Britta Dahnke</td>
<td>University of Essen, Department of Civil Engineering, Essen (Germany)</td>
<td>A/Prof. Tony Wong</td>
</tr>
<tr>
<td>Prof. Byougkee Han</td>
<td>Department of Mechanical Engineering, College of Engineering, Hongik University, Seoul (Korea)</td>
<td>Professor Paul Grundy / A/Prof. Raphael Grzebieta / Dr X.L. Zhao</td>
</tr>
<tr>
<td>Prof. M.R. Madhav</td>
<td>Department of Civil Engineering, Indian Institute of Technology (India)</td>
<td>Dr Malek Bouazza</td>
</tr>
<tr>
<td>Prof. Anthony D. May</td>
<td>University of Leeds, Institute for Transport Studies, Leeds (United Kingdom)</td>
<td>Professor William Young</td>
</tr>
<tr>
<td>Mr Christian Muench</td>
<td>University of Karlsruhe, Karlsruhe (Germany)</td>
<td>Professor Paul Grundy / Dr Xiao-Ling Zhao</td>
</tr>
<tr>
<td>Prof. Le-Wei Tong</td>
<td>College of Civil Engineering, Tongji University, Shanghai (China)</td>
<td>Dr. Xiao-Ling Zhao</td>
</tr>
<tr>
<td>A/Prof. Mengxi Zhang</td>
<td>Department of Civil Engineering, Lanzhou Railway University, Gansu (China)</td>
<td>A/Prof. Chris Haberfield</td>
</tr>
<tr>
<td>Prof. Masao Kuwahara</td>
<td>University of Tokyo, Traffic Engineering Laboratory, Tokyo (Japan)</td>
<td>Professor William Young</td>
</tr>
<tr>
<td>Prof. Per Haagensen</td>
<td>Department of Structural Engineering, Norwegian University of Science and Technology, Trondheim (Norway)</td>
<td>Professor Paul Grundy</td>
</tr>
<tr>
<td>Dr. Eric Hildebrand</td>
<td>Department of Civil Engineering, University of New Brunswick, Fredericton (Canada)</td>
<td>Dr Geoff Rose</td>
</tr>
<tr>
<td>A/Prof. S.K. Ting</td>
<td>Vice Dean, School of Civil &amp; Structural Engineering, Nanyang Technological University, Singapore</td>
<td>Dr Bill Wong</td>
</tr>
<tr>
<td>A/Prof. K.H. Tan</td>
<td>School of Civil and Structural Engineering, Nanyang Technological University, Singapore</td>
<td>Dr Bill Wong</td>
</tr>
<tr>
<td>Prof. Sami Rizkalla</td>
<td>Department of Civil Engineering, University of Manitoba, Canada</td>
<td>Dr Riadh Al-Mahaidi</td>
</tr>
<tr>
<td>Prof. Ian Smith</td>
<td>Department of Civil Engineering, University of New Brunswick, Canada</td>
<td>A/Prof HR Milner</td>
</tr>
<tr>
<td>Name</td>
<td>Contact Details</td>
<td>Staff Contact</td>
</tr>
<tr>
<td>----------------------</td>
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</tr>
<tr>
<td>Prof. Klaus Langweder</td>
<td>GDV Traffic Safety Research Centre Munich and Dresden University, Germany</td>
<td>A/Prof. R. H. Grzebieta</td>
</tr>
<tr>
<td>Prof. Gerald Nurick</td>
<td>Department of Mechanical Engineering University of Cape Town, South Africa</td>
<td>A/Prof. R.H. Grzebieta/ Dr X.L. Zhao</td>
</tr>
<tr>
<td>Prof. Narinder Gupta</td>
<td>Department of Mechanical Engineering Indian Institute of Technology New Delhi, India</td>
<td>A/Prof. R.H. Grzebieta/ Dr X.L. Zhao</td>
</tr>
<tr>
<td>Prof. Jim Rhodes</td>
<td>Em/Professor, Department of Mechanical Engineering, University of Strathclyde, Glasgow, Scotland</td>
<td>A/Prof. R.H. Grzebieta/ Dr X.L. Zhao</td>
</tr>
<tr>
<td>Prof. N. Jones</td>
<td>Department of Mechanical Engineering The University of Liverpool UK</td>
<td>A/Prof. R.H. Grzebieta/ Dr X.L. Zhao</td>
</tr>
<tr>
<td>Prof. T. Usami</td>
<td>Department of Civil Engineering Nagoya University, Nagoya, Japan</td>
<td>Dr X.L. Zhao/ A/Prof. R.H. Grzebieta</td>
</tr>
<tr>
<td>Dr Clive Chirwa</td>
<td>Automotive Engineering Faculty of Technology, Bolton Institute Bolton, UK</td>
<td>A/Prof. R.H. Grzebieta</td>
</tr>
<tr>
<td>Prof. J. Packer</td>
<td>Department of Civil Engineering University of Toronto, Toronto Canada</td>
<td>Dr X.L. Zhao</td>
</tr>
<tr>
<td>Prof. T. Mori</td>
<td>Department of Civil Engineering Hosei University, Japan</td>
<td>Dr X.L. Zhao</td>
</tr>
</tbody>
</table>

3. Course Offerings

Master of Transport and Traffic

The Master of Transport and Traffic began operation in 2000. It presented a distance education flexible learning approach to studying transport and traffic. The program attracted 11 students. Certificate and Graduate Diploma programs allow for articulation from various levels of entry.

Industrial Education Program

The Bus and Coach and Parking Industry programs continued to attract increased student numbers.

Undergraduate Civil Engineering Program

2000 represented the second last year of the development of the new education program. Courseware has been developed through to Level 3. The CDRom distributed to students and the Web page have found support from the students.
4. Research And Development

List of Research Projects Undertaken in 2000

Geotechnical Engineering

- Sonic echo methods for NDT testing of cast-in-situ piles (Seidel)
- The dynamic response of pile/soil interfaces (Seidel)
- The shear behaviour of rock joints (Haberfield/Seidel)
- The strength and deformation properties of rock masses (Haberfield)
- The performance of drilled pile shafts in rock (Seidel/Haberfield)
- The influence of construction procedures on pile capacity in rock (Seidel/Haberfield)
- Development of a design methodology for screwed cast-in-place piling (Seidel)
- Deep Soil Mixing (Seidel)
- Pile Integrity Testing (Seidel)
- Slope stability – computer analyses (Haberfield)
- Ground anchors (Heberfield)
- Enhancing pile and anchor performance using expansive cements (Haberfield)
- Wellbore stability for the petroleum industry (Haberfield)
- Use of bipolymer or biofilm barriers for waste containment (Bouazza)
- Containment of contaminants with vertical cutoff walls (Bouazza)
- Geotechnical properties of municipal solid wastes (MSW) (Bouazza)
- Gas permeability of GCLs
- Soil mixing

Structures

- Cyclic pullout/pushout performance of concrete plugs in tubular piles (Al-Mahaidi/Grundy)
- Interface shear transfer across cracks in normal and high strength concrete (Al-Mahaidi)
- Strength determination of slender concrete wall panels with and without openings (Al-Mahaidi/Sanjayan)
- Shear strength of reinforced concrete bridges (Al-Mahaidi/Taplin)
Flexural strength of reinforced concrete bridges (Taplin/Al-Mahaidi)
Strength assessment of bridge decks (Al-Mahaidi/Taplin)
Shear strengthening of concrete beams using fibre composites (Al-Mahaidi/Taplin)
Reserve strength of offshore structures under repeated load (Grundy)
Elastic behaviour, shakedown limit and ultimate strength of YT and KT tubular joints (Grundy)
Prestressed grouted pile/sleeve connections (Grundy)
Design criteria for bridge decks (Grundy)
Innovative tubular connections (Grundy)
Incremental collapse of tension legs and catenary risers (Grundy)
Interfacing of digital dial gauges to PC's development of complementary software for data collection (McKenry).
Experimental study to evaluate the mathematical model for behaviour of reinforced concrete walls in fire (Crozier/Sanjayan)
Properties of High Strength Concretes incorporating slag blended cements (Sanjayan)
Behaviour of high strength concrete under triaxial loading (Sanjayan)
Reliability assessment of ageing highway bridges (Grundy)
Life cycle performance evaluation and concrete bridge deterioration due to steel corrosion (Sanjayan, Taplin, Grundy)
Alkali-activated slag concrete (Sanjayan)
Load bearing capacities of slender walls (Sanjayan)
Innovative tubular connections at elevated temperature (Zhao/Grundy/B. Wong)
Innovative tubular connections under cyclic loading (Zhao/Grundy)
Fire resistance of tubular columns filled with high strength concrete (Zhao/Grundy/B. Wong)
Fatigue of thin-walled welded tubular connections (Zhao/Grundy)
High tensile tubular struts under large deformation cyclic tension and compression (Zhao/Grzebieta)
High tensile tubular beams under large deformation cyclic bending (Zhao/Grzebieta)
Investigation of tube in tube column structures (Grzebieta/Zhao)
Stability and strength of Very High Strength (VHS) circular tubes (Zhao)
Anchorage of plain bar reinforcement (Taplin)
Design of steel structures at elevated temperature (B. Wong)
• Structural Behaviour of Steel Plates at Elevated Temperatures (B.Wong/Tan)
• Temperature prediction of structural sections in fire (B.Wong/Ghojel)
• Durability of structural members reinforced by fibreglass (Williams)
• Bonding in fibreglass-concrete structural composites (Williams)
• Using fibreglass reinforcement for flexural shear (Williams)
• Carbon fibre and concrete composite beams (Williams)
• Mitigating injuries in playground falls (Grzebieta)

*Timber Engineering*

• Long term deflection performance of glued laminated timber (Milner)
• Application of the rate-process method in the prediction of wood adhesive durability (Milner)
• Mechano-sorpitive response of wood (Milner)
• Stressed skin housing using reconstituted wood panels (Milner)
• Evaluation of the performance of structural glulam from lamination data (Milner)
• Long term performance of reconstituted panel produces (Milner)
• Deflection characteristics of nail plate spliced beams (McKenry)
• Moisture suction and micro-buckling influences on Mechano-sorptive creep in timber (McKenry)

*Transport*

• "Level of service" of roads (Young)
• Modelling the effects of freeway incidents (Rose)
• Dynamic speed control on freeways (Rose)
• Telephone-based advanced traveller information systems (Rose)
• Travel awareness through survey feedback (Rose)
• Updating procedures for O-D matrices in traffic assignment (Rose)
• Capacity analysis of bicycle and pedestrian facilities (Rose)
• Impacts of safe routes to school schemes (Rose)
• Transport for the Disabled (Young)
• Modelling small area traffic model (Young)
• Environmental impacts of transport (Young)
Electronic road pricing (Yung)
Environmental impacts of transport (Young)
Modelling small area traffic networks (Young)
Multistorey parking (Young)
Modelling transport demand and parking management (Young)
Level of service in residential streets (Liepe/Daly/Young)
Performance based standards for heavy vehicle (J. Stevenson/Young)
Parking provision in inner city area (Young)
Parking in multi-use facilities (Tan/Young)
Equilibrium modelling of land use activities (Chandra, Young)
Vehicle movement at intersections (Akcelik/Young
Sustainability and urban transport (Codner/Young)
Review of Freight Transport Chain Case Studies for ARRB Transport Research for Austroads (Taylor)

Water

Updating the Flood Frequency chapter of Australian Rainfall and Runoff (Hadgraft and Q.J. Wang, University of Melbourne)
Building an electronic version of Australian Rainfall and Runoff (Hadgraft)
Rock ramp fishways (Keller)
Vertical slot fishways (Keller)
The role of vegetation in flood plain roughness (Keller)
The hydraulics of pool/riffle formation in rivers (Keller)
Design of minimum energy structures (Keller)
Estimation of extreme design rainfalls and floods (Weinmann/Siriwardena/Mein/Laurenson)
Estimation of extreme rainfall risks – a joint probability approach (Weinmann/Laurenson)
Holistic approaches to design flood estimation (Weinmann/Siriwardena/Mein/Laurenson)
Effects on rainfall estimation errors on flood modelling (Weinmann/Seed)
Impact of sand slugs on geomorphic variability (Rutherfurd/Mein)
• Hydraulic conductivity measurement for forested soils (Vertessy/Mein/Dunkerley)
• Geomorphic predictors of hydrologic response (Mein/Bates)
• Leaf area, interception, and transpiration in mountain ash forest (Vertessy/Tapper/Mein)
• Model prediction uncertainty under uncertain parameter information (Connell/Nathan/Mein)
• Sustainable water allocation – development of integrated water balance, climate and economic models (Codner/Weinmann)
• Frequency of extreme rainfall and flood events (Laurenson/Weinmann/Kuczera)
• Evaluation of the Performances of Constructed Wetlands in Stormwater Pollution Control (T. Wong/Wootton)
• Evaluation of the Performance of Gross Pollutant Traps (T. Wong/Wootton)
• The role of Wetland Vegetation on Stormwater Pollutant Removal (T. Wong)
• Pollutant Adsorption and Uptake Processes in Stormwater Bioretention Systems (T. Wong)
• Development and Evaluation of Water Sensitive Urban Design (T. Wong)
• A Decision Support System for Stormwater Quality Management (T. Wong)

**Environment**

• Sustainable development indicators (Codner)
• Salinity management in the Murray Darling Basin (Codner/M. Kendall)
• Sustainable development of water resources in developing countries (Codner/M. Verrochi)
• Characterisation of Stormwater Pollutants in Urban Catchments (T. Wong/Wootton)
• Hydrological, Geomorphological and Ecological Impacts of Urbanisation on Aquatic Ecosystems (T. Wong)
Engineering Education

- Environmental Engineering Education (Codner)
- The use of hypertext-based course materials for engineering education (Hadgraft)
- Development of Java-based course materials (Hadgraft)
- The development of network-based student support services (Hadgraft)
- The effect of learning styles on the student use of hypermedia (Hadgraft)
- How to empower students and staff within a university department (Hadgraft)

Road Safety and Crashworthiness Systems

- Maximising occupant protection in side impact accidents - analysis of the basic injury mechanisms relating to near-side and far-side crashes (Grzebieta/Fildes/Sparke/Zou)
- Assessing the structural crashworthiness of petrol road tankers in rollover accidents (Grzebieta/Rechnitzer)
- Maximising the strength of spot-welded plates (Grzebieta)
- Roll-over vehicle crashworthiness (Grzebieta/Rechnitzer)
- Investigation of lower limb injuries in side impact crashes (Grzebieta/Fildes/Sparke)
- Investigation into the physics governing whiplash injuries (Grzebieta/Tingval)
- Design of crashworthy trains (Grzebieta/Rechnitzer)
- Maximising crashworthiness of roadside infrastructure (Grzebieta/Zhao/Tingvall/Corben/Zou)
- Crashworthiness of trams (Grzebieta/Rechnitzer)
- Crashworthiness of concrete/steel road barriers in relation to small car impacts (Grzebieta/Corben/Tingvall/Zou/Kulgven)
- Design of crashworthy timber light and power poles (Grzebieta/Milner)
<table>
<thead>
<tr>
<th>Investigators</th>
<th>Title</th>
<th>Grantor</th>
<th>Amount Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Bouazza</td>
<td>Development of a new concept for waste containment: the stabilised sand mining tailings barrier</td>
<td>Australian Research Council Strategic Partnership with Industry Research &amp; Training (SPIRT) South Eastern Regional Waste Management Group (SERWMG) and Pioneer Australia</td>
<td>$85,000</td>
</tr>
<tr>
<td>P. Grundy</td>
<td>Tubular steel members and connections under high amplitude dynamic loading</td>
<td>Australian Research Council Large Grant Scheme</td>
<td>$64,056</td>
</tr>
<tr>
<td>X.L. Zhao</td>
<td>Tubular steel members and connections under high amplitude dynamic loading</td>
<td>Australian Research Council Large Grant Scheme</td>
<td>$64,056</td>
</tr>
<tr>
<td>R.H. Grzebieta</td>
<td>Tubular steel members and connections under high amplitude dynamic loading</td>
<td>Australian Research Council Large Grant Scheme</td>
<td>$64,056</td>
</tr>
<tr>
<td>R. Al-Mahaidi</td>
<td>Presentation of papers, TRB Bridge Conference in Tampa Florida and IAHS World Congress, Abu Dhabi</td>
<td>Faculty of Engineering Travel Fund, Round 2</td>
<td>$64,000</td>
</tr>
<tr>
<td>J. Seidel</td>
<td>The response of pile-soil interfaces during pile driving and dynamic testing events</td>
<td>Australian Research Council Large Grant</td>
<td>$53,724</td>
</tr>
<tr>
<td>E. Laurenson</td>
<td>Estimation of extreme rainfall risks (jointly with University of Newcastle)</td>
<td>Australian Research Council Strategic Partnership with Industry Research &amp; Training (SPIRT) Commonwealth Bureau of Meteorology, Victorian Dept. of Natural Resources</td>
<td>$35,450</td>
</tr>
<tr>
<td>G. Kuczera</td>
<td>Estimation of extreme rainfall risks (jointly with University of Newcastle)</td>
<td>Australian Research Council Strategic Partnership with Industry Research &amp; Training (SPIRT) Commonwealth Bureau of Meteorology, Victorian Dept. of Natural Resources</td>
<td>$35,450</td>
</tr>
<tr>
<td>P. Weinmann</td>
<td>Estimation of extreme rainfall risks (jointly with University of Newcastle)</td>
<td>Australian Research Council Strategic Partnership with Industry Research &amp; Training (SPIRT) Commonwealth Bureau of Meteorology, Victorian Dept. of Natural Resources</td>
<td>$35,450</td>
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<td>C. Haberfield</td>
<td>A micro-mechanical approach to the shear behaviour of rock joints</td>
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<td>Theoretical and experimental investigation into the ultimate strength of reinforced concrete T-beam bridges</td>
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<td>C. Tingvall</td>
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<td>Development and testing of an enhanced drive time algorithm</td>
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<td>A. Bouazza</td>
<td>Attending the International Symposium on physical modeling and testing</td>
<td>Monash Research Fund Travel Grant 2000 Round 1</td>
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<td>in environmental geotechnics, France</td>
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<td>H.R. Milner</td>
<td>Present paper at conference on Timber Engineering, Canada</td>
<td>Monash University Research Fund Travel Grants 2000 Round 2 (ERFTF)</td>
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<td>J. Seidel</td>
<td>Present papers at the 6th International Conference on the Application of Stress-wave theory to piles, Brazil</td>
<td>Monash Research Fund Travel Grant 2000  round 1</td>
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<td>G. Taplin</td>
<td>Present papers at Composite Construction in Steel and Concrete IV Engineering Foundation Conference Canada, and Canadian Society for Civil Engineering Annual Conference and 3rd Structural Speciality Conference, Canada</td>
<td>Monash Research Fund Travel Grant 2000  Round 1</td>
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<td>M.B. Wong</td>
<td>Present 2 offered papers at the International Conference on Structural Stability and Dynamics, Taipei, Taiwan</td>
<td>Monash University Faculty of Engineering Travel Grants 2000 Round 2</td>
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<td>P. Grundy</td>
<td>Committee presentation 16th Congress on International Assoc for Bridge &amp; Structural Eng Lucerne, Switzerland + ISSC 2000 pre-congress symposium, Tokyo, Japan</td>
<td>Monash University Research Fund Travel Grants 2000  Round 2</td>
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CRC and Key Centre Activity

Projects of the CRC for Catchment Hydrology always involve more than one Party to the CRC. Core projects which were predominantly based at Monash in 2000 include:

- **Sustainable Water Allocation, Program 3**
  Project 3.1: Integration of water balance, climatic and economic models (Gary Codner)

- **Urban Stormwater Quality, Program 4**
  Project 4.1: Stormwater pollutant sources, pathways and impacts (Tony Wong)
  Project 4.2: Stormwater Best Management Practices (Tony Wong)

- **River Restoration, Program 6**
  Project 6.5: Hydraulics and performance of fishways in Australian Streams (Bob Keller)
  Project 6.6: Developing tools to predict the scour of rehabilitation works. (Bob Keller)

Total funding for these and other projects and for the CRC Office activities at Monash was $988,496 in 2000.

Postgraduate students and research topics in 2000

<table>
<thead>
<tr>
<th>Student Name</th>
<th>PhD or Master</th>
<th>Project Title</th>
<th>Main Supervisor</th>
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<tr>
<td>Ali-Khall, Masood</td>
<td>PhD</td>
<td>Dynamic Performance of DuraSai Floor Systems</td>
<td>Dr. X-L Zhao</td>
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<td>Arndt, Naomi</td>
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<td>Biomechanical Analysis of Leg in Side Impact Automobile Crashes</td>
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<td>Bailey, Mark</td>
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<td>Improved Techniques for Treatment of Uncertainty in Physically-Based Models of</td>
<td>Prof. R. Mein</td>
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<td>Catchment Water Balance</td>
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<td>Bakharav, Tanya</td>
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<td>Chemistry Microstructure and Durability of Alkali Activated Slag Concrete</td>
<td>Dr. J.G. Sanjayan</td>
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<td>Bartley, Rebecca</td>
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<td>The recovery of Geomorphic complexity in streams</td>
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<td>Candappa, Dishan</td>
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<td>Shaft Resistance Between Pile and Soil Materials under Dynamic Loading</td>
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<td>Dale, Ken</td>
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<td>Davis, Sharon (Ms)</td>
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<td>Innovative Tubular Member subjected to High Amplitude Dynamic Loading</td>
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<td>Eley, Rachel (Ms)</td>
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<td>Influence of Vegetation on Stream Rating Curves</td>
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<td>Feikema, Paul (Mr)</td>
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<td>Giaccio, Craig (Mr)</td>
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<td>Theoretical and Experimental Investigation into the Ultimate Strength of Reinforced Concrete T-beam bridges</td>
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<td>Gu, Xue Fan (Mr)</td>
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<td>The Behaviour of Sandstone Concrete Joints</td>
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<td>Hewitt, Dean (Mr)</td>
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<td>The Influence of Mechanical Damage on the Side Wall Integrity of a Bulk Carrier</td>
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<td>Hoang, Tam (Ms)</td>
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<td>A Joint Probability Approach to Rainfall-Based Design Flood Estimation</td>
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<td>Hon, Alan (Mr)</td>
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<td>Hui, Jiao (Mr)</td>
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<td>Fracture Behaviour of Welded Connections in Cold-Formed Tubular Sections</td>
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<td>Lee, Tuan Kuan (Mr)</td>
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<td>Shear Strength of T-Beam Bridge Deck repaired using CFRP (Carbon Fibre-reinforced plastic)</td>
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<td>Best Practice In Water-Sensitive Urban Design</td>
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<td>Thin-Walled Tubular Connections under Fatigue Loading</td>
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<td>A Study of Parking Movement in Multi-Storey Parking Systems</td>
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<td>The Structural Use of Particle Board</td>
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<td>Performance of Geosynthetic Clay Liners as a Gas Barrier</td>
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<td>Fundamental modelling of two-dimensional jointed soft rock masses subjected to low confining stresses</td>
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<tr>
<td>Lee Tuan Kuan</td>
<td>Shear strength of concrete T-beams repaired using carbon fibre reinforced plastic (CFRP)</td>
<td></td>
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<tr>
<td>Roger Hadgraft/</td>
<td>Flexible Learning  Why is it important for our future?</td>
<td></td>
<td></td>
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<tr>
<td>Kaya Prpic</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Lindsay White</td>
<td>Contributions on fishways</td>
<td></td>
<td></td>
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<tr>
<td>Janice Green</td>
<td>Estimation of Extreme Rainfall Risks</td>
<td></td>
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<tr>
<td>Foo Hin Wong</td>
<td>Slender reinforced high strength concrete wall panels with openings</td>
<td></td>
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<tr>
<td>Mohamed Eichalakani</td>
<td>Monotonic and cyclic behaviour of circular hollow and concrete-filled thin-walled steel sections under large deformation pure bending</td>
<td></td>
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<tr>
<td>Hussein Khalaf</td>
<td>Direct risk assessment of ageing bridges traffic loads</td>
<td></td>
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<tr>
<td>Craig Giaccio</td>
<td>Theoretical and experimental investigation into the contribution of the flange to shear strength of concrete T-beams</td>
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<tr>
<td>Alan Hon</td>
<td>Investigating the behaviour of T-beam bridge decks in flexure</td>
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</table>
### List of Research Seminars presented by visitors to the Department

<table>
<thead>
<tr>
<th>Presenter</th>
<th>Seminar Topic</th>
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<tbody>
<tr>
<td>Dr. J. Chiang, Monash University, Malaysian campus</td>
<td>Asian model concrete code -- a brief introduction</td>
</tr>
<tr>
<td>Professor Sami Rizkalla from University of Manitoba, Canada</td>
<td>Repair and Rehabilitation of Bridges and Structures using Fibre Reinforced Polymer Materials - the Canadian Perspective</td>
</tr>
<tr>
<td>Professor Byoungkee Han from Hongik University, Seoul, Korea</td>
<td>Behaviour of Thin-Walled Tube Structure</td>
</tr>
<tr>
<td>Professor Ian Smith from University of New Brunswick, Fredericton, Canada</td>
<td>Are wood and timber distinct materials?</td>
</tr>
<tr>
<td>Dr. Sofia Alijahbana from Tarumanagara University, Jakarta, Indonesia</td>
<td>Dynamic response of elastically supported rectangular plate to a general surface load</td>
</tr>
<tr>
<td>Mr. Mark Stewart from University of Newcastle, Australia</td>
<td>Corrosion, spalling and risk-based optimisation of repair strategies for concrete structures</td>
</tr>
<tr>
<td>Professor P.J. Haagensen from the Norwegian University of Science and Technology, Trondheim, Norway</td>
<td>Post-weld fatigue life improvement</td>
</tr>
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</table>

### Publications

#### Books


Book chapters


Journal papers


Conference Publications


Young, W., Bonsall, P. and Li (2000) "Ethical issues in the selections of values for safety-related behavioural parameters or assumptions in traffic simulations". Conference of Australian Institutes of Transport Research and Education, Canberra, Australia.

Zhao, X.L. and Grzebieta, R. H. (2000): Strength and Ductility of Concrete Filled Double Skin Square Hollow Sections, 7th Int. Symposium on Structural Failure and Plasticity, Melbourne, 443-449


Reports


## Thesis Accepted for a Higher Degree

### PhD

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Supervisor</th>
<th>Thesis title</th>
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</thead>
<tbody>
<tr>
<td>Feikema</td>
<td>Paul</td>
<td>Prof. R. Mein</td>
<td>Tree growth and water relations in eucalypt plantations over saline shallow groundwater</td>
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<tr>
<td>Jordan</td>
<td>Phillip</td>
<td>Mr P.E. Weinmann</td>
<td>Effect on flood modelling of rainfall variability and radar rainfall measurement error</td>
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<tr>
<td>McJannet</td>
<td>David</td>
<td>Prof. R. Mein</td>
<td>Measurement and modelling of growth and hydrologic performance of plantations on hill-slopes</td>
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<tr>
<td>O Sullivan</td>
<td>Sharon</td>
<td>Prof. R. Mein</td>
<td>The relationship between leaf area index, rainfall interception and tree water use in different age classes of Eucalyptus regnans</td>
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<tr>
<td>Richard</td>
<td>Betty</td>
<td>Prof. R. Mein</td>
<td>Scale invariance analysis on channel network structure and possible implications for flood behaviour</td>
</tr>
<tr>
<td>Somes</td>
<td>Nicholas</td>
<td>A/Prof. T. Wong</td>
<td>An investigation of the hydrology and hydrodynamics of constructed stormwater wetlands</td>
</tr>
<tr>
<td>Taplin</td>
<td>Geoffrey</td>
<td>Prof. P. Grundy</td>
<td>The behaviour of composite beams under repeated loading</td>
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</table>

### MEngSc (Coursework & Minor Thesis)

<table>
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<th>Last Name</th>
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<tbody>
<tr>
<td>Bishop</td>
<td>Warwick</td>
<td>A/Prof. T. Wong</td>
<td>Modelling wetland hydrodynamics</td>
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<tr>
<td>Cumming</td>
<td>Alistair</td>
<td>Dr. G. Rose</td>
<td>A framework for bicycles at intersections</td>
</tr>
<tr>
<td>Curnow</td>
<td>Anita</td>
<td>Dr. G. Rose</td>
<td>In public, in private models for providing traveller information</td>
</tr>
<tr>
<td>Dikranis</td>
<td>Vicky</td>
<td>A/Prof. G.P. Codner</td>
<td>Assessing whether current waterway management in the Glenelg Hopkins region, Victoria, Australia, will achieve government policy objectives for ecological sustainability</td>
</tr>
<tr>
<td>Haupt</td>
<td>Leanne</td>
<td>A/Prof. R.J. Keller</td>
<td>The effect of rock tamp fishways on discharge measurement weirs</td>
</tr>
<tr>
<td>Kendal</td>
<td>Matthew</td>
<td>A/Prof. G.P. Codner</td>
<td>Review of salinity management in the Murray Darling Basin</td>
</tr>
<tr>
<td>Liepe</td>
<td>Brigitta</td>
<td>Prof. W. Young</td>
<td>Level of service on collector roads</td>
</tr>
<tr>
<td>Lin</td>
<td>Jason</td>
<td>Dr J. Sanjayan</td>
<td>Hydration temperatures of high strength concrete columns incorporating slag</td>
</tr>
<tr>
<td>Maheepala</td>
<td>Upaia</td>
<td>Mr P.E. Weinmann</td>
<td>Data acquisition and modelling of urban drainage catchments in the City of Knox</td>
</tr>
</tbody>
</table>

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33
5. Strategic Directions For The Future

The Department's Mission, Teaching and Research Strategies have been put in place.

Its mission is "To provide high quality Civil Engineering education, research and professional services globally for the mutual benefit of the students, the staff, the University, industry, the profession and the wider community".

The development of business plans for the Department and Sections are under way. These plans will be developed within the context of the Mission, Teaching and Research Strategies.

6. Professional Activities

Conference Attendance

ACI 2000 Spring Convention, San Diego, California USA, March.
5th International Bridge Engineering Conference, Tampa, Florida USA, April
XXVIII World Housing Congress: Housing Challenges for the 21st Century, Abu Dhabi, UAE, April.
IMPLAST 2000, Melbourne, October

Hydrus Short Course, Townsville, Qld, August.
2nd European Conference on Geosynthetics, Bologna, Italy, October.
GeoEng 2003, Melbourne, November

Grundy, P. 10th International Offshore and Polar Engineering Conference and Exhibition, Seattle, USA, May-June.
ECCS Technical Committee, Istanbul, Turkey, September.
IABSE Congress, Lucerne, Switzerland, September
International Ship and Offshore Structures Pre-Congress, Tokyo, Japan, September
ISSC-14, Nagasaki, Japan, October
IMPLAST 2000, Melbourne, October

Grzebieta, R.H. IJ Crash 2000, London UK, September
IMPLAST 2000, Melbourne, October
Road Safety Researchers Policy and Education Conference, Qld, November

Haberfield, C.M. GeoEng2000, International Conference on Geotechnical and Geological Engineering, Melbourne, November
John Booker Memorial Symposium, November

Hadgraft, R.G. HERDSA, Toowoomba, July

CRC Association Conference, Brisbane, May

Rose, G. International Association of Travel Behaviour Research, Gold Coast, QLD, July.
7th World Congress on Intelligent Transport Systems, Turin, Italy, November.
<table>
<thead>
<tr>
<th>Name</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanjayan, J.G.</td>
<td>Academics Forum of Concrete, Sydney, NSW, February. 8th International Conference on Computing in Civil and Building Engineering, Stanford University, California, USA, August. Advances in Cement and Concrete, Mont-Tremblant, Quebec, Canada, August.</td>
</tr>
<tr>
<td>Wong, M.B.</td>
<td>International Conference on Structural Stability and Dynamics, Taiwan, December IMPLAST 2000, Melbourne, October</td>
</tr>
<tr>
<td>Wong, Tony H F</td>
<td>7th International Conference on Wetland Systems for Water Pollution Control, Orlando, Florida USA, November</td>
</tr>
<tr>
<td>Young, W.</td>
<td>9th International Association for Travel Behaviour Research Conference, Gold Coast QLD, July. 22nd Conference of Australian Institutes of Transport Research, Canberra, December. IMPLAST 2000, Melbourne, October</td>
</tr>
<tr>
<td>Zou, R.</td>
<td>International Crashworthiness Conference, London UK, September IMPLAST 2000, Melbourne, October Road Safety Researchers-Policing and Education Conference, Qld, November</td>
</tr>
</tbody>
</table>
Official Contribution to Professional Organisations

Al-Mahaidi, R.  
Member, ACI-ASCE Committee 447: Finite Element Analysis Reinforced Concrete Structures.  
Member, Australian Composites Rehabilitation Committee

Bouazza, M.  
Member, ISSMGE-TCS: Environmental Geotechnics  
Member, IAEG commission 14 on Waste Disposal  

Codner, G.P.  
Invited member, National Board, The Environmental Engineering Society, IEAust.

Grundy, P.  
Member, Int. Institute of Welding Commission XV-E, Tubular Jo  
Chair, ISOPE Technical Committee, Tubular Structures  
Member, Inst. Ship and Offshore Structures Working Commission III.1 on ultimate strength  
Chair, Scientific Committee, IABSE Symposium, Melbourne 200

Grzebieta, R.H.  
Member, National Australian Standards Committee CE/33 Road Safety Systems Barriers (AS/NZS 3845)  
Corresponding Member, National Committee on Transport, IEAust  
Member, National Executive Committee of the Australian College Road Safety  
Member of Executive Committee of the Australian College of Road Safety, Victorian Chapter  
Chairman, IMPLAST 2000, 7th Int. Symposium on Structural Failure and Plasticity, Melbourne

Haberfield, C.M.  
Member, ASTM, Committee on Pressure meters D18.02.07, USA  
Chair, National Committee, Australian Geomechanics Society  
Australasian Vice President, International Society for Rock Mechanics  
Ex-Officio, Victoria Group Committee of the Australian Geomechanics Society  
Member, Organising Committee, GeoEng2000 – Int. Conf. on Geotechnical and Geological Engineering, Melbourne 2000  
Chairman, Technical Committee, GeoEng2000, Int. Conf. on Geotechnical and Geological Engineering, Melbourne 2000  
Member, Society Consultative Committee, IEAust

Hadjraft, R.G.  
Member, Higher Education Research and Development Society of Australia  
Member, Australasian Association for Engineering Education  
Member, Problem-Based Learning Assessment and Research Centre  
Member, American Association for Engineering Education

Mein, R.G.  
Corresponding Member, Water Engineering Committee, Institution of Engineers, Australia

Sanjayan, J.G.  
Member, Concrete Institute of Australia Committee, Victorian Branch  
Committee Member, Australian Concrete Research Forum

Taplin, G.  
Member, Standards Committee BD/32/2 – Composite Beams

Weinmann, P.E.  
Member, Revision Committee for Book VI of “Australian Rainfall and Run-off”
Wong, M.B.  Member, Australian Institute of Steel Construction, Victorian Committee  
Member, Institution of Engineers Australia, Structural Branch, Victorian Committee

Wong, Tony H F  Chairman, National Committee on Water Engineering, Institution of Engineers, Australia  
Chairman of Technical Sub-committee, 10th World Water Congress, Melbourne, March 2000  
Chairman of Revision Panel – Australian Rainfall and Runoff – Chapter 14 Urban Stormwater Management

Young, W.  Member, Chartered Institute of Transport Committee  
Member, Standards Association of Australia Parking Committee

Zhao, X-L.  Member, International Institute of Welding, Subcommission XV-E Tubular Structures  
Member, CIRED Working Group - Joints Behaviour and Fatigue  
Member, CIRED Working Group - Stability and Fire Resistance  
Member, Standards Australia Committee CS/23 - Security Screen Doors  
Member, AISC/WTIA Panel 6- Structures  
Australian Delegate to IWW Commission XV – Fundamentals of Design and Fabrication for Welding

Visits to Other Institutions

Al-Mahaidi, R.  University of Colorado, Boulder, CO, USA, April

Bouazza, A.  Naua Fasertechnik, Germany  
Technical University of Torino, Italy  
INSA, Lyon, France  
University Joseph Fourier, Grenoble, France

Hadgraft, R.G.  Queensland University of Technology, Brisbane  
Australia National University, Canberra  
Australia Catholic University, Canberra  
University of Western Australia, Perth  
Luleå University of Technology, Sweden

Sanjayan, J.G.  University of Sheffield, UK, July  
Cambridge University, UK, July

Wong, M.B.  Nanyang Technological University, Singapore, July  
Hong Kong Polytechnic University, Hong Kong, December

Zhao, X.L.  TongJi University, Shanghai, P.R China, January, 2000  
ZheJiang University, Hangzhou, P.R. China, May 2000  
TsingHua University, Beijing, P.R. China, December 2000
Editorial Services

Al-Mahaidi, R. Reviewer, Australian Civil Engineering Transactions
Reviewer, International Journal of Engineering Structures
Reviewer, Australian Journal of Structural Engineering
Reviewer, Intl. Conf. on Mechanics of Structures, Materials and Systems
Reviewer, ACUN 2 International Conference
Reviewer,_implast 2000 Conference

Bouazza, M. Member, Editorial Board, Int. Jnl. of Geomembrane & Geotextile
Reviewer, Int. Jnl. of Geomembrane & Geotextiles
Reviewer, J. of Geotechnical and Geoenv. Eng. (ASCE)

Grundy, P. Member, Editorial Board, Jnl. of Marine Structures
Member, Editorial Board, Jnl. of Strain Analysis
Reviewer, Australian Journal of Structural Engineering
Reviewer, Journal ISOPE
Reviewer, Marine Structures
Reviewer, IMPLAST 2000
Reviewer, ISOPE 2000
Reviewer, ISTS-9, 2001

Grzebieta, R.H. Member, Editorial Board, Int. Jnl. of Crashworthiness
Reviewer, Australian Journal of Structural Engineering
Reviewer, Intl. Journal of Impact Engineering

Reviewer, Australian Civil Engineering Transactions, IEAust.
Reviewer, Int. Jnl. of Rock Mechanics
Reviewer, ASCE, Geotechnical Engineering Division
Reviewer, 8th ANZ Conference of Geomechanics

Keller, R.J. Associate Editor, Int. Jnl. of Hydraulic Research

Rose, G. Editor-in-Charge, Transport Engineering in Australia

Sanjayan, J.G. Reviewer, Cement and Concrete Composites
Reviewer, Cement and Concrete Research

Seidel, J.P. Technical Editor, Fulcrum, Deep Foundations Institute
Reviewer, Australian Civil Engineering Transactions
Reviewer, ASCE Jnl Geotechnical Engineering Division
Reviewer, ATSM, Jnl of Geotechnical Engineering
Reviewer, Canadian Geotechnical Journal
Reviewer, 8th ANZ Conference on Geotechnical Engineering

Weinmann, P.E. Reviewer, Australian Journal of Water Resources
Member, Scientific Committee, 2nd Inter-Regional Conference on Environment- Water, Lausanne, Switzerland
Wong, Tony H F  
Reviewer, Urban Water  
Co-Editor, Proceedings of the 10th World Water Congress

Young, W.  
Assistant Editor and member, Editorial Advisory Board, Int. Jnl  
Transportation  
Member, Programming Committee, ISATA 2000  
Member, Scientific Committee, 9th International Association for  
Travel Behaviour Conference  
Member, International Technical Committee, Civil &  
Environmental Conference, New Frontiers and Challenges,  
Thailand

Zhao, X.L.  
Member, Editorial Board, Thin-Walled Structures  
Guest Editor, Progress in Steel Building Structures  
Editor, 7th International Symposium on Structural Failure and  
Plasticity  
Co-Chairman, 7th International Symposium on Structural Failure  
and Plasticity  
Reviewer, Journal of Structural Engineering, ASCE  
Reviewer, Structural Engineering and Mechanics  
— An international Journal  
Reviewer, International Journal of Offshore and Polar  
Engineering  
Reviewer, Advances in Structural Engineering — An International  
Journal

Services to Expert Bodies

Hadgraft, R.G.  
Member, Committee for University Teaching and Staff  
Development

Seidel, J.P.  
Member, IEAust Accreditation Panel for Engineering Associates

External Seminars, Courses & Workshops

Al-Mahaidi, R.  
Seminar, Strength assessment and testing of concrete T-beam  
bridge decks, University of Colorado, Boulder, USA, April  
Seminar, Strength and performance of precast concrete  
wall panels with openings, Public Works Department,  
Abu Dhabi, UAE, April

Bouazza, A.  
Short course on GCLs for waste containment in Turin, Italy  
(January), in Melbourne (July)

Haberfield, C.M.  
Seminar, Design of piles in rock, Melbourne, August

Hadgraft, R.G.  
Workshop on Problem-Based Learning and Technology for the  
Aust. Soc. Educ. Technology, October  
Lulea University of Technology, Sweden (With Dr J. Kaye Prpic)  
Various workshops for Higher Education Development Unit,  
Monash University
Keller, R.J. Seminar Environmental issues in River Engineering & Development, Caulfield, December
CRCCH Floodplain Management Workshop Series – Workshop #3 Flood Level Estimation, Monash University, October.

Sanjayan, J.G. Technology Seminar on Fire Resistance of Reinforced Concrete Walls, for the Concrete Institute of Australia, Victoria Branch, Holmesglen Conference Centre, May

Weinmann, P.E. Workshops, CRC-FORGE, Melbourne, June, July, August

Wong, M.B. Seminar on "Design of Structures Under Fire Conditions", Nanyang Technological University, Singapore, July

Wong, T.F. Seminar on Opportunities for Water Sensitive Urban Design to consultants and officers in the Shire of Gannawarra, June
Talk on Water Sensitive Urban Design to a seminar for urban planners organised by the Victorian Department of Infrastructure, July
Seminar on Water Sensitive Urban Design to the Urban Design Group and Specialist Review Panel of the Docklands Authority, October
Seminar on Water Sensitive Urban Design to engineering and planning staff and councilors of Mornington Shire, October
Field trip on Water Sensitive Urban Design for officers from DLWC (NSW) and Albury City Council, June
Field trip to the Lynbrook WSUD project for officers from VicRoads, July
CRCCH Design Flood Estimation Workshop, Monash University, July
Field trip on Water Sensitive Urban Design for 2 busloads of practitioners in stormwater management in the North East Catchment Management Authority and Goulburn Broken Catchment Management Authority regions, July
CRCCH Floodplain Management Workshop Series – Workshop #3 Flood Level Estimation, Monash University, October
CRCCH Short course on Planning and Design of Stormwater Management Measures, Monash University, October.
Series of 4 courses "Hydrology/Hydraulics for Flood Plain Managers" (with Weinmann, Mein and Keller)
Special Presentations

Grzebieta, R.G.  Crashworthiness of barriers: An engineer’s perspective, IEAust Structural Branch, Melbourne, October.

Wong, T.F.  "Source Control and Water Sensitive Urban Design" invited address to the Stormwater Industry Association’s Stormwater Source Control Seminar, Merrylands, NSW.
Talk in Brisbane on the Urban Stormwater Quality Program’s DSS project in a workshop on Stormwater Management and Reuse organised by the Queensland Branch of the Institution of Engineers and the Stormwater Industry Association.
Invited guest speaker at the Stormwater Industry Association dinner forum and spoke on the design, construction and operation of the stormwater management scheme in the Lynbrook Estate.

Consulting


Al-Mahaidi, R. & Taplin, G.  Strength assessment of three RC bridges, VicRoads Structural assessment of concrete pier structures in Port Philip Bay for ARRB
Advanced strength assessment of RC U-beams and prestressed planks, VicRoads

Codner, G.P.  Review of methods for quantifying capacity shares, Department of Natural Resources and Environment (Vic)

Donald, I.B.  Cliff stability, Daveys Bay, Mt Eliza
Embankment stability on soft clay – VicRoads

Grzebieta, R.H.  Modelling of water-filled roadside crash barriers, Barwon & Rawson

Grundy, P.  Fatigue assessment of crane runway girder, Hamilton

Haberfield, C.M.  Stability of East Arm Wharf, N.T. Department of Transport Works
Failure of Granite facades, Tress Cox & Macdox

Mein, R. & Wong, T.H.F.  Review 1 Devilbend Future Use Strategy (Pinnacle Property)

Sanjayan, J.G.  RNA Tunnel fire design, Maunsell McIntyre Pty Ltd, Brisbane

Testing of RC U-beams and prestressed planks, VicRoads

Taplin, G. & Grundy, G.  Evaluation of handrail of Arden St Bridge, Connell Wagner Engineering
Wong, T.H.F.  Peer Review of Consultant's report on Water Management Options for Devilbend Reservoir for Melbourne Water (together with Russell Mein)
Development of a methodology for the assessment of structural stormwater management measures implemented in the NSW Stormwater Trust Scheme (for NSW-EPA)

Young, W.  Consultant to NRTC (Performance-based Standards for Heavy Vehicles)

Zhao, X.L.  Fatigue of Tubular Joints in Lighting Poles

**Professional Development**

Taplin, G.  Use of multimedia software "Author" July

Wong, M.B.  Use of multimedia software "Author" July

Young, W.  Professional Development Program, Monash University, February

Zhao, X.L.  Performance Management Scheme for Academic Staff (Introduction), 19 May 2000
Performance Management Scheme for Academic Staff (Advanced), 11 August, 2000
Setting and Managing Priorities, 21 August, 2000
Leadership and Management Development Core Program Level One, 23, 30 October, 6, 13, 20, 27 November, 2000

7. **Funding Position**

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<td>Other operations</td>
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<td>Research</td>
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<td>$3,906,589</td>
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<td>Special purposes</td>
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<td>Other education</td>
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<td>$1,068,230</td>
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<td>Donations</td>
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<td><strong>TOTAL</strong></td>
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