Pace of University collaboration with industry quickens

Representatives of local mining companies and the Joint Coal Board inspect the Departmental Roof Bolting test rig with Departmental staff. At right, Professor L. C. Schmidt, of the Department of Civil and Mining Engineering, left, is seen with Mr Jim Carruthers from the Bellambi Colliery.

OVER the past 20 years the Department of Civil & Mining Engineering in the University of Wollongong has built up an increasing rapport with local industry. Particularly, the establishment of the Mining Research Centre has facilitated great expansion in contracts for joint work and research with the mining industry.

Currently, negotiations are being finalised for a major project that will be carried out over a period of four years investigating a facet of face-bolting in underground mines. The Department has been active in this area and has built and instrumented a full-scale laboratory drilling rig, and arranged a large-scale supply of compressed air for it.

At a meeting on July 14, five coal mining companies (and possibly a sixth) confirmed their support of a research program on rapid face bolting that will span four years. The five companies will each contribute $4000 a year for four years, thus yielding $80,000. A matching grant of $80,000 will be provided by the Joint Coal Board. The total value at that stage was $160,000.

The sixth mining company has now joined the program, thus adding a further $16,000, though there will be no matching grant from the Joint Coal Board.

As an example of further involvement, the compressor for the air supply was donated by another mining company, and was rebuilt by the Department; this donation alone was of a value of $13,000.

Late in 1985, the Department instrumented and load-tested for BHP a new lightweight beam for lifting ladles, that, with their contents of molten steel, can weigh up to 400 tonnes. This project involved staff determining, under both static and dynamic loading, strains in a number of positions within the large structure. Although it took many days to prepare the beam for testing, the full-scale test was completed in an 18-hour period.

One of the glamour projects recently completed was to carry out a three-dimensional stability check of the design for the flagpole structure for the new Parliament House in Canberra. The flagpole, which will probably become a national symbol, is estimated to cost approximately $3m. This project included looking at the many ways nature can load such a large and novel structure.

With the increasing traffic load on roads, concrete is currently in demand for major sections of highways. Quality control of the concrete is of increasing importance for both strength and shrinkage. Of recent times, the Department has been responsible for the quality control of the Camden by-pass; currently it is responsible for quality control on the first stage of the Port Kembla Grain Terminal, which involves the jetties.

The wide variety of industry projects is further shown with two other current projects.

The National Capital Development Commission has contracted the Department to carry out an exhaustive series of static tests.
University-industry collaboration from page 1

on slip-base poles. These poles are to provide a brittle type of resistance in the case of a car crash, thereby preventing the crushing of the occupants.

The Department has recently contracted to test, both under static and dynamic conditions, steel structural sheeting. This project includes testing of various types of sheets under extreme wind pressure, and also the determination of the fatigue life for each type.

A unique wind tunnel was constructed by the Department some years ago, and it is now finding great use in the study of coal dust blowing off large coal stacks. The study of dust suppressants and spoil pile seals is frequently being undertaken for local industry, and also the Port Waratah concerns, quite apart from the chemical manufacturers.

Many other minor projects are undertaken and include a study of dust problems at the Coal Loader, impact testing of parts for a locally made roof bolting machine, testing of new plastic machine parts and corrosion of roof bolts in mines.

Joint projects are often undertaken in conjunction with the Computer Centre. Of late a joint project with both local government and county councils from Dubbo and Penrith resulted in the fee being used to purchase necessary software for the Faculty's venture into CAD/CAM. Other joint projects with the Computer Centre include the offering of the first course in Computer Aided Drafting, and a course for industry was given early in July this year. Another joint project is current with the Londonderry Occupational Safety Centre of the Department of Industrial Relations and involves the study of coal mine explosions and fires, recently supported by NERDDC.

A major area of study has been associated with mine gases and a number of projects are undertaken with mining companies. One particular project recently resulted in a very-long-term loan of scientific equipment to the Department valued in excess of $85,000.

With the passage of time, and with the direction much of engineering has taken, the Department is becoming increasingly involved with computer applications, and actively promotes staff in offering courses to industry. A course is being formulated in computer project management and expert systems for the near future.

Logic Research Group

AN additional member has been attracted to the group in the Mathematics Department working on Combinatory Logic and Lambda Calculus. He is Dr Adrian Rezus from the Computer Science Department of the Catholic University of Nijmegen, Netherlands.

Dr Rezus is a Romanian whose 1981 Ph.D. from Utrecht (Netherlands) was entitled 'Lambda-Conversion and Logic'. Among his publications since then are 'A Bibliography of Lambda-calculi combinatory logics and related topics' and 'Semantics of Constructive Type Theory'.

Dr Rezus' visit is funded by the Netherlands Organisation for Pure Scientific Research.

Other members of the group are Dr Roger Hindley (Swansea Wales), Professor Jonathan Seldin (Montreal Canada) and Dr Martin Bunder.
Seminars and conferences such as this are frequently hosted by University of Wollongong Departments, enabling wide-ranging and invaluable discussion between industry and University researchers.

University of Wollongong a top growth industry for Illawarra

THE University was described in a full-page article in The Sunday Telegraph on August 3 as having become one of the area’s biggest growth industries. Among the points made were that the University’s ‘combined workforce of 8407 students and staff make it second only to BHP, with 12,800 on the payroll.

And spending by the university, staff and students generates more than $50 million in sales of goods each year, according to John Steinkne, Dean of the Faculty of Commerce.

These figures illustrate the amazing growth that has taken place since its forerunner, a university college, opened in Wollongong in 1962 to add a new dimension to a city best known for its coal mines, steel and magnificent scenery.

From humble beginnings in that first year, when only 308 students attended, the university now boasts 7457 students, with 7600 expected next year.

This year there were 682 overseas students studying at the university. They come from Africa, America, Asia, Oceania, Europe and Malaysia.

Increasing numbers of students are coming from Sydney (about 40 per cent) because the metropolitan universities have reached their optimum size and because of its growing reputation, Wollongong is being seen as a valid alternative.

The university also has been able to respond to government initiatives to increase opportunities for young people and the disadvantaged.

However, this increase in numbers has put considerable strain on resources because the university is not adequately funded for building or operating expenses, staff say.

The university will continue to press for more government funds and to place high emphasis on building better links with industry and the community and attracting increasing levels of resources from outside bodies.

Uniadvice, the consulting company for the university, which aims to link the needs of the community with the academic skills and research facilities of the university, turned over $485,000 last year and expects that figure to rise to $600,000 this year.

Its work is funded through private enterprise or government-sponsored research.

The university also has been able to build its links with the community through the Friends of the University which now has 700 members.

Conservatorium of Music scholarships

The Wollongong University Conservatorium of Music is moving to implement the BHP Steel Sponsorship for the Conservatorium Training Orchestras. This exciting project has been made possible by a generous grant from BHP, and it is anticipated that it will become the focus of a significant musical development in the Illawarra region.

Overall responsibility for the project will be taken by the Conservatorium Orchestral Executive, consisting of Mr James Powell, Principal of the Conservatorium; Mr Adrian Falk, Lecturer in Cello at the Conservatorium; and Mr David Vance, University Music Development Officer.

The BHP project has made possible the offer of six scholarships for the study of oboe, bassoon, french horn, trombone and percussion.
Major international conference hosted by Mechanical Engineering

THE Second International Conference on Bulk Materials Storage, Handling and Transport was hosted by the National Committee on Bulk Materials Handling of the Institution of Engineers, Australia, the event was the first major conference sponsored by the Institution to be held in Wollongong. Over 220 delegates attended, from all over Australia and from nine overseas countries.

Wollongong was chosen by the National Committee because of the reputation the University has for its research and work with industry in the field of bulk materials handling.

Topics were wide-ranging and included Belt and Screw Conveying, Belt and Chute Cleaning, Bin and Feeder Design, Bin and Silo Discharge Problems, Computer Simulation of Handling Systems, Handling of Coal, Measurement of Flow Properties of Solids, Open Cut Mining Operations, Overland Conveying, Pneumatic and Hydraulic Conveying of Solids, Port Facilities, Silo Loads and Structural Design.

Some features of the Conference rendered it different from other Institution Conferences. While approximately 65 per cent of the papers had authors from the universities or the CSIRO only 17 per cent of delegates were from those organisations. The others were from industry. This made for a valuable exchange of ideas, experiences and problems between the two sectors.

Delegates had opportunities to visit the unique facilities in the University’s Bulk Materials Handling Laboratory. Several were surprised at the range of activity in the laboratory, and to learn of the heavy involvement of industry with many aspects of the research taking place.

With Australia at the forefront of much of the research and practice of modern bulk materials handling, it was fitting for the book Guidelines for the Assessment and Loads on Bulk Solids Containers to be launched at the Conference. These guidelines have been prepared by the Working Party on Bins and Silos of the National Committee on Structural Engineering, Institution of Engineers, Australia and they contain many aspects of the bin loads research that has been undertaken over the past decade at The University of Wollongong. Already there is much interest in the book from groups working on similar tasks in the UK and Europe.

Keynote speaker was Mr J. K. Ellis, General Manager, BHP Steel International, Slab and Plate Products Division, Port Kembla. Mr Ellis chose as the theme for his paper, ‘BHP The Materials Handling Company’. The topic was clearly appropriate for, he said, BHP was built on successful bulk materials handling. BHP is often referred to as a steel or mining company, occasionally as an oil company, but seldom is it recognised as a major materials handling company.

Three visiting speakers engaged the audience at a seminar on peace studies held at The University of Wollongong on August 19. Barbara Wien of the World Policy Institute, New York, described the enormous boom in peace studies courses at United States universities. David Aspin, professor of philosophy at King’s College, London, exposed the absurd logic behind the vehement attacks on peace studies in Britain. Finally, Vanessa Letham of the Peace Education Project, Perth, told about the enthusiasm by school teachers and students for workshops in conflict resolution in Western Australia.

The seminar was organised by the Peace Studies Working Party which was set up by University Senate following a survey by the Wollongong University Nuclear Disarmament Association (WUNDA) which showed widespread support for peace studies among staff and students. The working party includes members from a variety of departments, and has been preparing a document outlining the form peace studies might take at Wollongong University. The seminar was the opportunity to present this document for discussion and debate to interested people and also to learn from the visiting speakers.

Barbara Wien is the author of the popular Peace and World Order Curriculum Guide which gives 40 case studies of peace studies programs in the United States. She told the seminar about the state of peace studies in the US and also in countries from Canada to China. Although US tertiary institutions are far ahead of Australia in introducing peace studies programs—there are numerous degree-granting programs, for example—there are also difficulties. Many of the US courses are one-off efforts, and there is a lack of committed resources. These problems provide some lessons for any Australian program.

David Aspin described the ideological attack on peace studies in Britain. As a Quaker involved with the Bradford University School of Peace Studies—which is funded by the Quakers—he was astounded by some of the criticisms of peace studies by right-wingers.

Vanessa Letham has found that one of the usual approaches to peace studies, starting with military technologies, strategies and the consequences of war, is often not a good one for students. High-school students feel powerless in the face of war, and one way to overcome this is to develop visions of peace and of how each individual can contribute towards peace in a small way as part of a wider movement.

Members of the working party came out of the discussion reinforced in their belief that peace studies is something that is important for The University of Wollongong, and something where the University can take a leading role in Australia.
THE School of Creative Arts in the University of Wollongong is noted both for its dynamism and for the diversity of courses it provides. The list ranges across a spectrum embracing Bachelor of Creative Arts, which moved into its third full year at the beginning of 1986, to Arts Fusion, Arts Theory and the History of Arts. Students are encouraged to visit studios apart from their major subjects and to work in them should they wish.

In the Visual Arts part of the course the subjects are sculpture, ceramics and textiles. This year in the textiles course there are currently 17 majors enrolled. These include some associate diploma students. Students in these categories attend theory and art history lectures and also attend a weekly drawing class. Lecturer in charge of the textiles course Liz Janeid encourages students to keep a visual journal in which to note ideas and impressions and to attend as many exhibitions as possible.

The term textiles has unfortunate associations with dressmaking courses and high school theory courses so that prospective students, Liz Janeid feels, are not always sure of the course content.

The range of skills, techniques and materials used by the textile or fibre artists is vast and may include weaving, fabric painting, dye procedures, paper and felt making, knitting and various construction techniques.

Students become involved in weaving or printing lengths of fabric, making costumes, working on sculptural forms or working back into the surface of the piece. It is possible to work in other areas and in fact it is actively encouraged that students should do so.

This year third-year students are having to undergo a week of work experience in an attempt to bridge the gap between being a student and being 'out there'.

The contemporary fibre artist is concerned with image, surface and form, even though the finished product might have a distinct function.

While developing skills the emphasis in the textile course is based on generating an innovative approach to the textile arts.

Students exhibit their work in the Long Gallery at the University at the end of the year. Currently 1985 graduates are showing work at the Wollongong City Art Gallery and at the Graham Gallery at Mt Kembla. Professional practices are part of the course—developing a portfolio, simple costing, and promotion are some of the areas covered.

Liz Janeid suggests that anyone with an interest in textiles is assured of a warm welcome at the studio. She can be contacted by telephone. Her number at the University is 270 048.
EPAC is trailing way to technology, says Wollongong academic

AT last the money men are starting to take technology issues seriously. That the 19th paper of the Economic Planning and Advisory Council (EPAC) addresses the subject of Technology and Innovation should be a matter of rejoicing, or relief, on the part of all those concerned for the future of Australian industry.

It would appear to signal that the issues of technology are at last being taken seriously not only within the directly responsible Ministries of Industry, Technology and Commerce, and of Science, but also now within the economic corridors of power. It is therefore a great pity that the Report offers only the most superficial view of the state of technology and innovation in Australia. It does catalogue the poor record of Australian industry in this area. It notes 'the efficient use and provision of new technology is essential for improving and sustaining economic growth'. But there is no sense of urgency and in the main the options proposed do not go far beyond existing policy.

The major concern of the EPAC Report is 'raising the historically low level of private sector research and development (R&D) expenditure'. Well and good. Since the dramatic drop in industrial R&D reported in 1976-77, there have been repeated warnings from science policy circles of the dire consequences of this low level of R&D investment for the international competitiveness of Australian industry.

But does that situation still exist? While Australian Bureau of Statistics data indicate it certainly did until 1981/82 and probably did until 1983/84, we simply don't know what the situation is today. There is evidence that the combined effects of the 150 per cent tax concession for R&D and a new awareness of the importance of technology are leading corporations to substantially increase their R&D investment.

This may or may not eventuate. Time will tell. But the thought that economic planning is based on statistics five years out of date, particularly given the rapidity of change in technology, might be expected to be a matter for alarm.

The explanations provided by EPAC for the low level of R&D are the by now familiar list of macro-economic and policy failings: low levels of investment, biases of the tax system, tariff barriers, a focus on the domestic market, and foreign ownership. But that is all. There is no suggestion that useful lessons might be drawn, for example, from the experience of those companies that do perform a high level of R&D regardless of all the macro-economic reasons why they shouldn't.

Nor is there any recognition that industry is not homogeneous. Thus recent statistics from OECD when compared with the 1981/82 Australian position (see table) show that where not much R&D is carried out worldwide, Australia's research effort is comparable with our OECD competitors. But in the R&D intensive sectors Australian industry lags by a factor of from two to five, and much more if computers and aerospace are included. Obviously different industry sectors perform differently, and need different policies.

When it comes to 'ensuring that government funded research and development follow the most useful path', EPAC appears to be in a more familiar territory of limiting public expenditure. Thus it is with more con-fidence that it recommends consideration of alternative funding arrangements for the CSIRO and the tertiary education sector to encourage greater links with industry. In particular it suggests government provision of a level of "core" funds, frozen at some predetermined level. Any expansion should come from contract funding matched possibly by a contribution from government.

In the way these proposals are presented, they are likely to be received with a howl of defensive criticism. But in many ways these ideas make good sense. Provided there is a guarantee to maintain the level of support in real terms this proposal is not far from what CSIRO has already acknowledged as appropriate. Similarly, given a recognition that the major determinant of research funding for the higher education sector is student enrolment, an approach could be formulated which might in fact increase the level of research. The lubricant of matched funding would almost certainly be necessary, though, to achieve quick results.

If the EPAC Report provides a spur for greater action on technology policy issues and a wider acceptance of their significance at Cabinet level, it will have proved useful. But if what the Australian economy needs is the mobilisation of skills and resources, the aggressive exploitation of new potentials, and a keen awareness of the competition, then this Report is no role model. It exemplifies what we are trying to escape.

Professor Ron Johnston, Director, Centre for Technology and Social Change

GENERAL UNIVERSITY PREPARATION COURSE AND SCIENCE PREPARATION COURSE FOR WOMEN

RESEARCH initiated by the University's Planning and Development Unit last year indicated that although participation rates by women in courses were nearing parity proportions, female students were still significantly under-represented in some science-based programs. This situation, together with indications that other people in the community were seriously disadvantaged as far as access to tertiary education was concerned, prompted a proposal for establishment of a second PEP (Participation and Equity Program) course. Funding was approved and this year 40 students are engaged in preparatory courses aimed at providing alternative mechanisms for University entry.

In general, women enrolled in the Science Preparation Course are mature age and completed formal schooling in an era when some secondary science subjects were not readily accessible for girls. As well, societal and peer expectations often precluded participation by girls in subjects preparatory to careers in the "hard sciences". Encouragement to leave school early and engage in courses other than those destined for university entrance, further disadvantaged opportunity in science.

Although most students on the program have spent the last 10-15 years raising families and managing households their early enthusiasm for science has, however, not dimmed. University Preparation Courses are aimed to "bridge the gap" so to speak, between where many female students left off and where they need to begin again next in science-based subjects.

The task is a mammoth one but if determination, interest and latent ability count for anything then many women enrolled in the Science Preparation Course will find their way to Undergraduate degree courses in 1987.

They will join graduates of the Aboriginal and General University Preparation Courses in forming a significant new sub-group of students at The University of Wollongong.
Bernard Eveleigh, Edith Kouto and Richard Waite

THE exhibition of jewellery, paintings and photography, held in the Long Gallery at The University of Wollongong, from early August until September 7, must rank as one of the more notable ever staged by the highly innovative School of Creative Arts.

The bringing together of three disparate disciplines in one exhibition might seem to present an odd mix. Yet, in observing the exhibited works it quickly became apparent that painter Kouto and photographer Waite share a deeply consuming interest in landscape.

Waite’s work indeed is derived entirely from the remote, barren and rock-strewn landscapes (if that term might be used to include water and often-dramatic sky) encountered in parts of England, Wales and Scotland. Waite uses black and white photography to striking—almost staggering—effect.

In one series of shots at Blackpool and at New Quay, Dyfed, he goes out at dawn and photographs the meeting of the Atlantic Ocean and the Welsh coastline. Sea mist rises over the surface of the water and between the boulders, washed-by-centuries rocks and sands of feet up, alpine peaks projecting through cloud.

Kouto on the other hand works in colour, depicting, sometimes eerily, the landscapes of the southern hemisphere. She also, strikingly, explores the human figure.

Bernard Eveleigh distils what he sees and feels in landscape and in his imagination forms re-emerge, magically transformed.

The picture displayed by Bernard Eveleigh embraced a ten-year period, from pieces he designed and made while at the Central School of Art Design in London to his most recent range of brooches. His work displays considerable versatility—even to the use of coloured titanium.

The picture at the top of column 3 shows a fish necklace by Bernard Eveleigh, whose exhibits embraced ceramics, ebony, enamelling, and work in gold, niobium, silver, titanium and precious stones. On the right is a picture typifying the work of Richard Waite. His remarkable rock formation was shot at Mulham, in Yorkshire.

Australian freight railways—an overview by Wollongong academic

MANY people see railways as rather old fashioned and costing the taxpayer over a million dollars a day. Yet Western Australia has some new private railways that, each year, are efficient in moving millions of tonnes of bulk commodities.

How about the government railways in Australia? These are examined in a paper presented earlier this year at the 11th Australian Transport Research Forum in Darwin by Dr Philip Laird from the Department of Mathematics in The University of Wollongong. His observations include:

EFFICIENT RAIL OPERATIONS are impeded by five different government administrations, three different rail gauges, and some antiquated intercity main line track (e.g., between Sydney and Melbourne).

SOME SYSTEMS ARE MUCH MORE EFFICIENT THAN OTHERS

For example, Queensland Railways made an operating profit last financial year of over $100 million. Australian National and Westrail are moving to more commercial operations. V/Line in Victoria and State Rail in NSW have the largest deficits.

NEW CAPITAL WORKS

Some, such as Queensland’s electrification of Brisbane’s suburban rail system and now their coal railways are quite impressive. Queensland, like New Zealand, favours easing light-radius curves and modern high-voltage alternating-current as part of their electrification projects—an opportunity missed by State Rail in Sydney-Wollongong electrification.

PROGRESS IN GAUGE STANDARDISATION

Although slow, this has been assisted by the Commonwealth. At Federation in 1901, only NSW had standard-gauge railways. Now standard gauge extends to all Mainland State capitals and Alice Springs. It may one day extend to all Victorian and South Australian mainlines.

ROAD FREIGHT

Around the world, trucks are currently rail’s major competitors for freight. However, railways in Australia have to compete with road hauliers who for years have been paying less than equitable contributions towards the cost of the roads they use in the course of their business.

In conclusion, the paper suggests that a more efficient railway system will require not only better management, but infrastructure improvements as well. Dr Laird also suggests that the Federal government should expand its role in developing Australia’s national rail network. Otherwise, the assessment of the Federal Transport Minister Mr Morris that the national rail system is a hotch potch of rail systems and an inefficient unreliable network will remain valid.

Dr Laird is a Senior Lecturer in the Department of Mathematics. He is closely involved in transport research as well as in mathematics. He is a graduate of Victoria University of Wellington, the Australian National University and the University of Calgary in Canada.

Dr Laird’s interest in railways is well known in Wollongong. He is a spokesperson for the Community Transport Concern Association. Since its formation in 1979 this action group has campaigned for safer roads, rail electrification and better public transport.

This interest in public issues has assisted Dr Laird in gaining valuable perspectives on national transport issues. One example is the transport of coal to Port Kembla. In searching for reasons why so much export coal is moved by heavy trucks to Port Kembla, Dr Laird has investigated road-cost recovery from the road-freight industry as well as questions of rail capacity and efficiency. These topics are of increasing importance as shown by the recent Inquiry and Report of the Inter-State Commission into cost recovery arrangements for Interstate land transport.
Open Day Sunday October 12

Open Day, traditionally at the University of Wollongong Open Weekend, will in fact be truly Open Day this year. It will be held on Sunday October 12.

Confining the event to a one-day affair is rendered necessary by the great amount of building under weigh on campus. For this reason, too, the commercial exhibits—arranged by Expo—which have in the past added so much to the enjoyment, will be absent from the scene.

Sunday has been chosen—rather than Saturday—since it has always been the better-attended of the two days.

The absence of Expo apart, Open Day will follow the traditional pattern—with live and static displays by Departments and Schools. The welcome turned on by University staff and students will be as warm as ever.

Children and adults alike will be able to see something of university life, the Department of Physics will once again be providing effects right out of Dr Who and the children—not to mention their parents—will be able to sample for themselves the fun to be had from making the acquaintance of a computer keyboard and display unit.

MISS Sue Carthew has recently received recognition from two sources for her PhD research: The Breeding System of Banksia. Sue was awarded a prestigious Australian Museum grant of $986 to fund the continued use of automated photographic techniques to monitor animal pollinators visiting Banksia spinulosa.

In addition Sue was the joint winner (with Mr Ed Slater) of the photographic competition at the recent Adelaide conference of the Australian Mammal Society.

Sue's project involves an integration of several aspects of biology: genetics, plant reproductive biology and animal behaviour. This integration is necessary to establish how pollinator behaviour determines plant seed production in Banksia species. One major difficulty is that mammals are important pollinators and they are nocturnal. Indirect techniques are therefore required to monitor mammal activity.

The results of the automated trip technique developed by Sue Carthew and Ed Slater speak for themselves in the accompanying photograph which shows a sugar glider visiting a Banksia inflorescence.

TASC Researcher wins Commonwealth Government Industrial Democracy Research Grant

PROFESSIONAL Officer in the University's Centre for Technology and Social Change, Stewart Carter, has been awarded a $12,535 grant by the National Labour Consultative Council (NLCC) to carry out research on industrial democracy and employee participation.

The grant was one of 11 announced by the Minister for Employment and Industrial Relations, Ralph Willis, who is also chairman of the tri-partite NLCC sub-committee on employee participation which selected the projects for funding.

Casual employment is to be the focus of the research, and particularly the problems this type of employment, which is increasingly widespread in Australia, may pose for traditional industrial democracy and employee participation schemes.

The research aims to make practical recommendations directed at specific difficulties experienced by casual employees, particularly in the retail sector. Casual employees will be surveyed and interviewed. The research is expected to show how the concept of industrial democracy can be applied to part-time employees.

Mr Carter said that the problems of casual employment in an industrial democracy context had been highlighted in previous research on industrial relations in the retail industry that he had carried out last year for both the Victorian and Commonwealth governments.

As many as 70 per cent of the members of the major retail industry union are casually employed he said, a phenomenon whose significance is only really appreciated when it is realised that, in terms of numbers of members, the union—the Shop Distributive and Allied Employees Association (SDAEA)—is the largest in Australia.

The new study has the backing of the SDAEA, and is expected to be completed by July next year, when it should be published as background to the Commonwealth government's soon to be released 'green' or 'policy discussion' paper on industrial democracy.

Case Studies from Automation and Engineering Applications Centre

A LIST—an impressively comprehensive list—of case studies and technical reports is now available from the Automation and Engineering Applications Centre of The University of Wollongong. Included is information on automatic assembly and packing of electrical connectors, assembly and riveting of guide wheels to steel rails, automated assembly of a circlip and a bearing plate, automatic cap tipping of chair legs, nesting and palletising of braces, distributed and centralised computing systems for process monitoring and reporting, interfacing considerations between a robot and a computer, assembly of large painted panels, concept design for automatic switch module assembly, automatic assembly of can openers, concept design of an automatic packing system, automatic and palletising of bags, automatic winding of wire coils, design for an automatic soldering station, automated electrical appliance assembly, automated electroplating unit, automatic soldering of induction coils, automated spectrometer testing of weld samples, conveyer and manipulation of assemblies through an X-ray tester.

In addition there is a list of conference papers—and included also is a brief description of AEAC’s linear tracks and turnover units.

The case studies are available at $25 each. AEAC asks that requests for reports, together with a cheque, should be sent to The Managing Director, AEAC, 323 Keira Street, Wollongong, NSW 2500.

Also available from AEAC is a newsletter, Robotics Now, dedicated to flexible automation for Australian manufacturing. The publication appears bi-monthly and is available free on application to AEAC.