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**ESA MISSION STATEMENT**

*Promoting systems, spaces and designs for People*

## Editorial

G'day all,

An interesting report was released recently. The Strategic Research Development Committee of the National Health and Medical Research Council released a report with the messy title - "Paradigm shift. Injury: from problem to solution. New research directions". It includes some relevant figures – work related injury causing 430 deaths in 1995, total economic cost \$27 Billion (compared to a total economic cost of injuries due to road accidents of \$6 Billion for the same period).

The report assesses the status of research regarding occupational injuries as:

*"moderately well documented but information on hospitalisation and minor injury is poor. Limited sound evaluation of preventive intervention strategies. Poor information on cost-effective selection of systems of treatment and rehabilitation. Costs are known but cost benefit of prevention is fragmented" p. 15.*

There is a challenge for our profession - evaluate what we do.

The report also notes that:

*"Commonwealth research resources has been reduced in this sector (occupational health and safety) and progress... has been slowed. While there is a need to review the level of research in this area, the pressures created by the injury burden beyond the road an occupational sectors creates an imperative for the health sector to build a research base in this area". (p. 31).*

Here is another challenge. Ensure that the scope of our profession continues to encompass both occupational settings and injury prevention in general.

The final chapter of the report proposes "Future directions for injury research" includes a recommendation that funding for injury research (currently \$2.5 Million per annum) be increased to a level consistent with other priority areas such as Cardiovascular disease, cancer, and mental health, that is, to \$26 Million per annum.

The report also recommends that -

*"the NHMRC, through the Research Committee (RC) and in conjunction with the Strategic Research Development Committee (SRDC) develop a five-year strategy for injury research. This should .... Focus on issues of: developing a*

*viable program of Australian injury research; definition of detailed priorities for injury research and the development of an appropriate mix of investigator driven and commissioned research; and allocation of a research quota for injury research and a strategy for utilising this quota for high quality relevant research". (p. 41-42).*

Two areas in particular are singled out for special attention: Falls and Youth. On the topic of falls, the Committee write that:

*"...falls create a major part of the injury cost burden (almost 25 percent). The cost of injury is spread across all ages. High fall rates among the elderly and projected demographic shifts ... indicate that these costs will rise sharply if preventive strategies are not identified and implemented.... This concern with the elderly should not however cause us to lose sight of the fact that the cost of falls is distributed over the whole of life. The understanding of fall injuries among children, adolescents and adults is poor. Biomechanical knowledge is limited. Where there is evidence of effective interventions, large trials and cost benefit analyses are limited, especially those applying to Australia" (p 42-43.)*

I'm not sure whether the analysis which lead to this conclusion are sound, I'd want to know a bit more about this surprising (to me, and also the authors of the report) finding that falls are the single largest cause of injury costs (Figure 2, p. 5) but details regarding the method of calculation are not provided. I'd be interested in comments from members.

Regardless, the report indicates the NHMRC will consider falls, and injuries to adolescents and young adults, to be priority areas.

Best wishes,

*Robin Burgess-Limerick*  
robin@hms.uq.edu.au

STOP PRESS - Shann Gibbs wins Liberty Mutual Prize. More details next issue.

### FROM JIM CARMICHAEL

In the December 1998 issue of *Ergonomics Australia*, in the Summary of the Competencies, Qualifications and Membership article (p29-30), Margaret Bullock was quoted as pointing out the fact that Australia has the least demanding criteria for achieving recognition as a certified ergonomist of any federated society

I note that in the April 1999 edition of *Ergonomics Australia* (p 9) under the heading "Certification Standards Workshop", it was stated that "... the Australian competencies (should) be brought into line with international standards – most of which are reputedly higher than those set in Australia". The article then goes on to indicate that a comparison be undertaken of the certification requirements of various Societies.

I think that it is important that it be noted that the author of the above mentioned article has confused the notion of competency standards and certification programs. They are very different concepts. I believe that the author of this article had the intention of implying that the ESAs certification program needs to be brought into line with the programs of other federated societies (most of which reputedly require a higher standard than the certification program of the ESA). I trust it wasn't intended to ascertain that the ESAs competency based standards are of a low standard.

As the member of the ESA who managed our Society's competency based standards project, I believe that it should be clarified that the set of competency based standards developed in Australia (and New Zealand) with contributions by many members, dictate a high professional standard.

The ESA competencies document does not represent certification or represent curriculum requirements, although the ESA and educational institutions may find it useful as a resource for either.

The accepted competency standards for the ESA and the NZES are a milestone for the Society as the formulation of competency standards are the basis or foundation of an effective quality assurance system that regulates the standards of practice within a profession. Components of this system should include appropriate education and

curriculum for ergonomics courses, accreditation of these programs, a certification scheme and an effective continuing professional education program. Underpinning all this is the establishment of competency-based standards for the ergonomics profession. These standards provide a description of the profession's expectations of the minimum competencies that must be able to be demonstrated by those holding themselves out to be ergonomists. The challenge is now with the Society regarding the proper use of the standards and the development of an appropriate assessment regime.

### FROM WENDY MACDONALD

#### COURSE CHANGES AT LA TROBE

The year 2000 will see the beginning of some major changes to the ergonomics courses offered at La Trobe.

We will be introducing undergraduate subjects that form the start of a double degree: Bachelor of Occupational Therapy/Bachelor of Ergonomics. These subjects will also be offered in the Bachelor of Health Sciences, and in another double degree that is expected to start in 2001: Bachelor of Physiotherapy /Bachelor of Ergonomics.

In the BOccTher/BErg double degree, it is expected that the initial intake into the double degree stream will be around 10-15 students. They will elect to do the double degree at the end of their first year of OT, and completing it in a total of 5 years. To achieve this, several years are "overloaded" - that is, they have more coursework than a normal undergraduate year. The double degree with Physiotherapy is at an earlier stage of development but we envisage that a similar structure will apply.

In the Bachelor of Health Sciences, the ergonomics subjects will give students who are studying this generalist degree a good foundation in the underlying disciplines of ergonomics. We'll be monitoring the level of interest at this level, since there is the possibility at a later stage of "stand-alone" Bachelor of Ergonomics, incorporating coursework from the ergonomics component of the double degree.

These are very exciting developments. While we have taught some individual undergraduate ergonomics subjects in the past, these will be the first that are part of an integrated undergraduate ergonomics course. We see this as evidence of the maturation of ergonomics education in Australia, mirroring earlier developments in Europe and North America. It will provide us with an opportunity to explore more extensively with students the science underpinning ergonomics and the breadth of application areas. We've felt for some time that this has necessarily been curtailed in the highly compressed graduate courses.

But we can't do everything – at least not without additional staff! 1999 may be the last year in which we accept students into our current entry level graduate course – the Graduate Certificate in Workplace Ergonomics. It would be sad to see the graduate entry route come to an end after 20 years and some 500 graduates, but the combination of the ESA's persistent unwillingness to require ergonomics qualifications for membership, the demanding work/study commitments of our students and the government's introduction of course fees for courses like ours has led to the gradual decline in intake numbers to economically unviable levels. In principle we could continue to teach both graduate and undergraduate courses but additional staff would be required, and with the present low numbers of graduate students this would not be sustainable.

In 2000 we will offer the second year of the Postgraduate Diploma in Ergonomics, to enable people who completed the Graduate Certificate in 1998 or 1999 to advance to Diploma level. Beyond 2000, graduate programs offered will be limited to Master of Ergonomics (by coursework and minor thesis, or by thesis alone), Master of Applied Science, and PhD. We also intend to offer occasional short courses such as the recent one on Plant Safety.

What about opportunities for graduate entry beyond 2000? We see this as very much dependent on how ergonomics develops in Australia. To develop as a truly "professional" field of practice – and to catch up with current international standards – it is essential that appropriate ergonomics education plus relevant experience be required of people aspiring to practice as ergonomists. In the current economic climate, the

courses necessary to achieve this can exist only if the profession itself demands such qualifications, as reflected in its membership requirements and professional certification criteria.

In recognition of these issues we have argued that the reintroduction of entry-level graduate courses in ergonomics should only be supported

*"if/when* the Ergonomics Society of Australia introduces more stringent membership and professional certification criteria. Such a change would be consistent with current international standards as specified by the International Ergonomics Association and is currently under consideration."

(quote from a document submitted to the relevant Faculty committee)

This position is accepted within our Faculty. If such changes are made, La Trobe University would welcome the opportunity to cooperate formally with the ESA in developing appropriate new course content and structure, and we would have a good case for the appointment of additional ergonomics staff to support expansion of our program.

In the meantime, we both look forward to many busy years of teaching, research and consulting – rumours of our demise notwithstanding!

# President's Message

---

Greetings to all ESA Members,

It seems no time since the last edition. The wonders of email create the impression that most of us talk to each other day, (and night!). A brief overview on current ESA issues under our 4 strategic goals.

## 1. MEMBERSHIP

The issue of ESA membership has been brought to the Board's attention again, as a result of recent announcement from La Trobe University in relation to changing course offerings in 2000. (see article by Wendy Mac Donald / Owen Evans in this edition).

The May meeting of the ESA Board will be voting on a range of motions relating to the development of a strategy to address the future membership structures. Certainly our Universities need the support from ESA to help justify the levels of teaching expected to obtain membership levels within our professional society. We cannot sit idle and watch the potential for ergonomic training standard to lower due to lack of education opportunities in Australian Universities.

## 2. PROFESSIONAL DEVELOPMENT

Each of the ESA Branches are currently developing their programs for 1999/2000, together with budgets. It is pleasing to see the high standard of the programs, and the opportunities for interchange with other professional societies with interests relevant to ergonomists.

## 3. PROMOTION

The Victorian Branch pilot on marketing with RMIT students is about to finish its first stage. A second group of students have been offered to ESA for continuation.

The South Australian and ACT Branches have both been developing an ESA Brochure for general circulation to prospective members. These should be available for general use shortly.

Various ESA members have been in the media lately extolling wisdom on ergonomics matters. Dr Michael Regan has even been on NZ TV talking about Human Factors research at Monash University.

## 4. FINANCES

Our Treasurer is currently collating the finances for the 1998/99 financial year. The consolidation of funds has already commenced with Term Deposits being renewed in one central investment account. Each Branch will soon be submitting their budgets for 1999/2000 based on their respective needs.

It has been tremendous to witness the current level of enthusiasm and commitment amongst ESA members in debating the range of issues via email.

This medium provides a wonderful opportunity for us to open up our consultation across all ESA members.

Don't forget to register now for Cyberg 99 on <http://www.curtin.edu.au/conference/cyberg>

Look out for the ESA 99 Conference brochures for Fremantle - out soon (October 10th - 13th).

Regards,

*David C Caple*  
ESA President

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## CHISIG ON THE MOVE

As you may have noted, CHISIG has been, ehm, quiet, for some time. In fact, things were so quiet that Roger Hall and I, after having written a provocative article in the CHISIG News (CHISIG: Dinosaur on a respirator?) called a meeting in October last year to decide whether we should give it a decent funeral, or whether members felt strongly enough about CHISIG to partake in its resurrection. Of course, it is an evitable fact of life that everything has a 'use by' date. Given that people nowadays have access to plenty of information on the Net, to international HCI organisations, and go to more conferences overseas, and so on, it was quite feasible that a local HCI group had outlived its purpose.

Alas, members decided CHISIG does indeed have a purpose, but that a revitalisation program was necessary for it to move on. A largish group then set out to draft a strategic plan aiming to inject new life and bring CHISIG into the next millennium. This plan was presented to the membership at the AGM during the OZCHI conference in Adelaide in November, and the enthusiasts were given the go-ahead to translate that plan into action during 1999. This is happening right now, so allow me to give you a flavour of just one of the projects that are unfolding.

## THE CHISIG WEBSITE

Swinburne University of Technology is running a HCI course both for Graduate Diploma and undergraduate students. Hands-on HCI experience is usually difficult to provide in a one-semester course; real-life software development projects take several months, if not several years to complete. Because anything to do with people is so distant from the interests of the average IT/Computer Science student, HCI tends to seem like high-flying theoretical mumbo-jumbo - soft stuff, nothing to do with us, with cutting smart code, why-do-we-have-to-suffer-this, blah, blah, blah...

Website development could, we argued, provide just the forum allowing students to work through the crucial steps of defining the user interface, designing and testing paper prototypes during the course of a semester. And so it was that all our 350 students produced prototypes for the CHISIG website.

The CHISIG website committee prepared a design brief, a video tape in which some five CHISIG stakeholders representing different user groups were interviewed, giving their views on what they thought the website should do for them. In addition, a number of web addresses of organisations covering HCI and ergonomics interests, including the ESA sites, were given, and students were asked to interview fellow Software Engineering and HCI students. Data from these sources formed the basis for specifying user needs and that way, defining the contents, links, and activities for the site.

Students have now developed the paper prototypes. We have insisted on paper to demonstrate just how much can be learned and done before coding starts. In fact, for the next part of the assignment, students are required to perform usability evaluations on their paper designs using different methods. Meanwhile, the CHISIG website committee is evaluating a sample of prototypes that are now being studied in more detail to identify the winner. And – winners will have their names displayed somewhere on the website as well as receiving some kind of award which has not been specified yet.

The sheer excitement of working with a 'real' client is obvious, as is the prospect of having one's name blasted out on the net, and the possibility of some tangible, probably monetary, reward. So, we have decided to make the announcement an event to which all students are invited. A number of the prototypes will be on display, much like a poster session at a conference. There will be feedback from the website committee, drinks, nibbles, and short speeches by (very few!) important people, and much more.

ESA/CHISIG members are also cordially invited to be there and share the fun with us.

Date: 3 August 1999

Time: 4:30 – 7:00 PM

Venue: yet to be announced

## CHISIG/UPA MEETING IN MELBOURNE

Since 1997 CHISIG has had informal links with the UPA (Usability Professionals Association) in the US. The UPA is catering to the specific needs of usability practitioners who work in industry. In Australia the number of such people is growing steadily, and the CHISIG/UPA meetings are run every two months, so far only in Melbourne, and you are most welcome to join these meetings

Date : 16th June 1999

Topic: And then a miracle happens: moving from requirements to design

Speakers: To be confirmed.

Venue: Level 4, 360 Elizabeth St (Melbourne Central), Melbourne

Time: The meeting will start at 6.30 pm sharp. Please aim to be there at 6.15 pm as access is restricted after that time.

If you wish to become a CHISIG member, please contact either the ESA Secretariat in Canberra.

Greetings

*Gitte Lindgaard*  
Chair CHISIG

## THE HISTORY OF THE IEA

The history of international ergonomics, or more precisely that of the IEA, has recently created quite a lot of interest. The fiftieth anniversary of the Ergonomics Society has no doubt contributed to that interest. Some federated societies like HFES and SELF have formally designated historians, others have persons who de facto serve in that role. New books on the history of ergonomics/human factors are soon to be published and some new textbooks have interesting chapters on the history of ergonomics.

Brian Shackel from the UK was the first IEA historian. He started writing the document on IEA's history and gathered an important archive of historical documents that has now been transferred to the present historian, Ilkka Kuorinka.

In spite of the growing interest, sometimes the question is asked whether there is really a need to know of the IEA history. When the IEA Executive Committee in 1998 formally decided on the publication of the IEA history book, it might not have had in mind George Orwell's maxim in his book "Nineteen eighty-four": "The one who controls history, controls future". Definitely the history of ergonomics can not be controlled in the Orwellian sense. Merely the decision was in line with the views of the Federal President of Germany, Richard von Weizsacker. He said "If the eyes are closed to the past, then the present cannot be seen either".

The history book project progresses, some of the material has been located and some very interesting interviews of the early ergonomists are envisaged. The aim is to have the book ready for the IEA 2000 conference; an ambitious schedule, I must say.

Already many interesting details have popped up. Did you know for example, that the first IEA congress in 1961 in Stockholm was also a congress of "biotechnology". At that time the notation "ergonomics" was not yet fully established. Later "biotechnology" was dropped because ale brewers (and other biochemistry based industries) adopted it. Some still think that beer (brewing) is more important than ergonomics!

Hywell Murrel from the UK explored various concepts and names to end up with "ergonomics" around 1950. He notes in the Ergonomics Research Society's history (Edholm and Murrel, 1973) that adoption of "ergonomics" was far from unanimous. Later it was shown that Wojciech Jastrzebowski had used in Poland the same name in a similar context one hundred years earlier. An interesting letter from Murrel to Professor Monod explains his thoughts around the concept. Further excavations into the historical documents may still bring new elements of the discussion to light. For example, Hugues Monod has identified many "fore runners" whose activities can be conceptually defined as being ergonomic although they may not have used that expression.

Only the surface of the history of ergonomics has been scratched until now. Every contact brings new interesting elements and topics that clarify the "whys" and "hows" of today's ergonomics. We have many reasons to continue to dig at the early phases of our discipline.

The plea of the historian is: If you are aware of historical material, documents, writings, articles, etc. related to ergonomics, please, let me know. The contact details are below.

IEA historical archives have existed formally since 1998. They are currently located at the historian's place but the secretary general and the historian are working to find a permanent solution for archiving all IEA documents in one place.

Thus, if you have in your possession historical documents related to the IEA and which you do not want to keep anymore, please, do not throw them away. Let me know of it, so that we can find a way to transfer it to the historical archives.

Ilkka Kuorinka  
IEA Historian

Postal address:  
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email [kuorinka@crdi.fr](mailto:kuorinka@crdi.fr)

Ilkka Kuorinka - The IEA Historian

## **THEORETICAL ISSUES IN ERGONOMICS SCIENCE**

Theoretical Issues in Ergonomics Science, a new peer-reviewed journal from Taylor & Francis, will begin quarterly publication in both print and electronic formats in the spring of 2000.

The aim of the new journal is to stimulate and lead the development of a theoretical basis for the science of ergonomics and to formulate a methodology of this science.

Editor-in-Chief Waldemar Karwowski invites submissions that address a broad array of the theoretical issues, methodology, and philosophical aspects of the science of ergonomics.

Articles should be sent to:

Waldemar Karwowski  
Center for Industrial Ergonomics  
University of Louisville,  
Louisville, KY 40292;  
502/852-7173,  
fax 502/852-7397;  
E-mail: [karwowski@louisville.edu](mailto:karwowski@louisville.edu).

A full guide for authors, including instructions for electronic submission is available from:  
e-mail: [ppagano@taylorandfrancis.com](mailto:ppagano@taylorandfrancis.com)

## **OCCUPATIONAL ERGONOMICS**

This new journal will publish peer-reviewed original papers, covering a variety of occupation ergonomics issues including, but not limited to: prevention of work-related musculoskeletal injuries, task analysis, work design, occupational accidents, cognitive engineering, disability management, legal issues and the modelling of physical/mental stress at work.

The subscription price is NLG 440/year for 4 issues; an approximation of the Dutch price is \$US 234.

For information on submitting manuscripts, contact the editor-in-chief Biman Das at [Biman.Das@dal.ca](mailto:Biman.Das@dal.ca) or see the web site [www.iospress.nl](http://www.iospress.nl)

## JUNIOR ERGONOMIST

The abstract below is from an investigation into the incidence of back pain in school children. It has some interesting recommendations. The project has won several awards for its author, Shruti Iyer, who is an 8th grade student (14 years old).

### OBJECTIVE

Do children carrying backpacks, musical instruments, sports gear and personal items to school daily, develop back pain?

### RESEARCH

Data does not exist in the scientific literature on the safe weight for a school child to carry. However, physicians, nurses, physical therapists, chiropractors, and ergonomists have recommended "common sense" guidelines. Children should not carry more than 10 to 20 % of their body weight. So I chose the average, as the Reference Standard: A child should not carry more than 15% of their body weight.

### PROCEDURE

1. Prepared and distributed 100 survey questionnaires to 6th, 7th and 8th grade students (11 to 14 year olds).
2. Obtained parent and student consent to weigh student and their carry-on items.
3. Weighed 36 students and their carry-on items, at the nurse's station in school.

### Major Conclusions

1. There is a problem in school children carrying items back and forth from school.  
61% of the students have pain, and carry items above the reference standard.  
65% female students and 50% male students complained of pain.  
73% students have shoulder pain; 41% have back, and left and right hand pain; 32% have neck pain;  
27% have right shoulder pain; and 14% have right neck pain.
2. The students carry an average of 20% weight, above the reference standard.

3. The 6th graders carry the most weight (18.2% average body weight), compared to 8th and 7th graders who carry 18% and 17% of their body weight on average respectively.
4. Most school children do not wish to let their weights known confidentially, even for a scientific study.
5. Among carry-on items, 41.4% are books, 30% are musical instruments, 11.9% are sports gear, 11.6% are personal items, and 4.7% are other unspecified items.
6. Males (80%) carry more items above the standard, than females (50%).

### MAJOR RECOMMENDATIONS

1. All the affected parties should be educated about this problem, i.e. Children, Parents, Schools, Medical Community and Politicians.
2. Everything possible should be done, to keep a child's carry-on weight to a minimum, e.g.:  
Provide a second set of books to keep at home.  
Carry the books and other items in Roller Bags.  
Choose the proper Backpack, and use the correct techniques in carrying them.  
Make the "few" teachers go from classroom to classroom, instead of the "large" number of students.
3. Book publishers should make the books lighter, and put the books in CDs.
4. Research should be done to develop acceptable guidelines through a controlled study.

*SHRUTI R. IYER*

# Branch News



Camperdown  
(opposite Sydney University)

May, 5th

To Screen or Not To Screen? A case study of pre-employment screening at NSW Fire Brigade  
Brian Woods October, 6th Working on the roads –  
Mobile plant safety and ergonomic issues Stephen Ward

June, 2nd

Concrete Testing – Changing the Standard Pepe Marlow

November, 3rd

Feeling the heat: current views on thermal stress at work  
John Brotherhood

July, 7th

Safety Culture  
Dr Ann Williamson

December, 1st

Spinal analysis for patient handling  
Andrew Mc Intosh

Notes about forthcoming program 1999

2 June 1999 ESA Branch Meeting

Welcome to New Members Night  
Speaker: Pepe Marlow – Concrete Testing

Pepe Marlow has agreed to talk about concrete testing and the realities of the process involved in changing a standard. She is hoping to show a video that will illustrate the work of a concrete tester as specified in the original standard. It will be seen that this arrangement required some terrible postures and there was a very real need for change. Her talk will illustrate a case study of how an apparently immovable object (a standard) was changed. This is bound to have relevance for many ergonomists who worry about the most effective way to implement change in entrenched regulations.

7 July 1999 ESA Branch Meeting

Speaker: Dr Ann Williamson – Safety Culture

*NB: We are currently investigating the possibility of holding this as a special dinner meeting at a venue such as UNSW University Club.*

## NSW

Wednesdays, 6.00  
for 6.30 pm  
@ Worksafe Australia  
Auditorium  
92-94 Parramatta Road,

Ann Williamson is a Senior Lecturer in Psychology at the University of NSW and was previously the Head of the Human Factors and Ergonomics Unit at Worksafe Australia. Her extensive career in occupational health and safety has included:

- the development and evaluation of human performance analysis methodologies;
- the effects of hazardous exposures on behaviour and the nervous system;
- human error in the causes of accidents;
- the problems of unusual working hours;
- fatigue in road transport;
- occupational stress; and
- the development of a measure of safety climate.

4 August 1999 ESA Branch Meeting

Jenny Long – Computer Vision Syndrome

Jenny Long is an optometrist who works in private practice. Frustrated by trying to treat occupational problems - such as Computer Vision Syndrome - simply with a pair of spectacles or contact lenses, she developed an interest in OHS & Ergonomics. She is currently studying for her Master of Safety Science at UNSW. Jenny also presented one of the student project reports at our April 7 meeting.

## NOHSC ITEMS OF INTEREST

*NOHSC holds information seminars at least once a month in the NOHSC auditorium (Worksafe) at 3.30pm for about an hour each. The session is called "Wednesday Wise-up" and there has been an extended invitation to Ergonomics Society members who may attend if they are interested. The session is held on the same day as the ESA Branch meeting:*

On 16 June the NSW Branch has an unexpected bonus to add to its scientific programme. Rebecca Mitchell has persuaded the Star City Casino to welcome a group of ergonomists for a site visit and evaluation. One of the rehabilitation co-ordinators there will lead the tour, which will include viewing some of the injury prevention mechanisms that have been implemented by Star City. For security reasons, only 12 members will be able to take the tour so early booking with Rebecca is essential.

As fewer people are adjourning to a restaurant for a meal after our monthly scientific meetings, the committee has decided to arrange a special mid-winter social event to get encourage more informal contact among members and friends. On Wednesday 7 July we are holding a dinner meeting at the UNSW Uni Club. Our after-dinner guest speaker will still be Dr Ann Williamson as advertised in our regular meeting calendar - but the venue will be warmer in all respects! We hope to attract a number of non-members > from associated faculties to this event as a means of marketing ergonomics as well as well as providing an interesting night for members and their friends. Ann's topic is happily very appropriate: "Safety culture: is it the answer to all of our safety problems?" Please contact Shann Gibbs for further details and bookings.

At our last committee meeting a number of concerns were discussed in relation to various Australian Standards. NSW members are encouraged to contact Shann Gibbs if they are aware of the need to review any standards in relation to ergonomic, safety and design issues. Some examples noted, relate to Glass in buildings; Guidelines/handbook of ergonomics; factory and officework; cargo barriers. Shann would be grateful to hear also from any members in other states who may be addressing problems with any standards. Results will be sent to Canberra for national co-ordination. (See Shann's contact details below) Much excitement in Sydney ergo circles - our Chairman, Max Hely and his wife Colette have a son born on the morning of our May Scientific Meeting (5 May). Congratulations to the ecstatic parents and best wishes to Cedric Liam Hely.

*Shann Gibbs*



*Dr. S.M. Gibbs and Dr. N.L. Adams at Shann's graduation*



## WA

1999 Conference  
11th - 13th October 1999  
Fremantle  
Western Australia

4 months to go!! and counting down. By the time you read this, you should have your registration brochure. Don't put it in your pending/procrastination tray - act on it now! (If you are reading someone else's Ergonomics Australia and haven't got a registration brochure, contact either myself on (08) 9319.8760, email [kjjones@cantech.net.au](mailto:kjjones@cantech.net.au) or Keynote conferences on (08) 9382. 3799, email [keynote@ca.com.au](mailto:keynote@ca.com.au))

In the next few months, you will no doubt hear more about the scientific program at the conference, so in this month's issue, we thought we might emphasise some of the delights of the social program to whet your appetite. The social committee have not only been working on the welcome reception and the conference dinner, but also the Tuesday afternoon Podiatric Journey through Fremantle. The committee have been seen testing the slip resistant surfaces of Freo's footpaths as well as a few famous watering holes. They have assured us that sitting on the Freo wharf, eating fish and chips and staring out to the ocean, is helping them assess the contrast ratio between blue sky and ocean. (We did begin to worry when when their research started involving anthropometric data and a well-known 'therapeutic appliance shop').

The social committee have assured us that the Conference Dinner at the Fremantle Sailing Club promises plenty of shear and compressive forces and a little noise induced hearing loss. As well as that, fine foods and tastings of our own South West Region wines will be just some of the delights of the evening.

Stay tuned for more information on the scientific program in the next Ergonomics Australia. Please contact us if you need any further information.

Meanwhile, book your tickets to Perth for the 1999 Conference.

*Kerry Jones*  
Conference Co-Convenor



## QLD

A lot of behind the scenes work is being done on ERGO Week 99. This will be a significant professional development opportunity for all members. The week will also

incorporate a seminar day aimed at industry. Wednesday, November 3 will be the member's breakfast at Docksider. A professional development day for members of the Queensland Branch based on competency development will be on Thursday November 4.

An industry Seminar entitled "Ergonomics in the Reduction of Permanent Injuries at Work" will be held on Friday the 5th of November. Topics such as the following will be covered:

- The size and nature of the problem
- Sudden versus cumulative damage
- Useful tools and strategies for potential permanent injury sources
- The Ergonomist's role in the reduction of permanent injuries
- Workshops on methods and strategies and new Advisory Standards and Guides
- Final session: ergonomic implications and issues in workplace agreements



## VIC

### BRANCH VISIT TO MONASH DRIVING SIMULATOR

*(Mark Dohrmann)*

We had a great meeting at Monash University Accident Research Centre (MUARC) on March 25th. MUARC at Clayton is an internationally-recognised injury prevention research centre. Many of their 60+ people are experienced human factors and ergonomics specialists, working to encourage effective translation of their transport, domestic, community, occupational and sports injury prevention research into practice. MUARC operates an advanced mid-range driving research simulator.

MUARC human factors researchers and Society members *Prof Tom Triggs* (Dep Director) and Dr *Mike Regan* (Snr Research Fellow) hosted an excellent meeting with 18 Society members. Tom is a Past President and Fellow of our Society, and Mike is a Member and Past Chairman of the ACT Branch of the Society.

Tom gave us an overview of MUARC and its research and consulting activities. Mike spoke next about their recent simulator research which has led to development of a CD-ROM aimed at training safety-critical skills in novice car drivers. We were given a trial run of the CD, which presents young drivers with up to 86 graded digitised video sequences designed to provoke, train and test the user. Next we went to the driving simulator. What fun! Sitting in a Ford with fully-detailed scenery filling the entire visual field whipping by. Guess who charged up Bourke St at 95 kph, tried to overtake a tram and pranged it?

### OFFICE ERGONOMICS ROUND ROBIN SEMINAR

Wednesday 16 June 1999

6pm to 9pm

Royal Melbourne Hospital

- Ground Floor Function Room

Parking is on Grattan St, Royal Parade or Flemington Rd and the (pay as you exit) underground RMH carpark - access from the entrance off Royal Parade just past Melbourne Private Hospital.

Enter the Royal Melbourne Hospital's "MAIN ENTRANCE" - a set of steps (and ramp) leading up from the Grattan Street pavement. Walk ahead in a STRAIGHT LINE {through the Outpatients' Block and the Main (East-West) Block} into the North Wing. Signs will direct you to the Ground Floor Function Room which is on the right hand side of the North Wing.

Members and non-members interested in good management of work in an office environment should make sure to attend this informative seminar. A number of presenters with high level expertise and experience will run 20-minute sessions on a range of most relevant topics. There will be opportunity to discuss specific questions in a small group environment.

The sessions will address working environment issues, visual needs and lighting, workstation design, optimum furniture specification and quality control, sick building syndrome, ipause gymnasticsi relaxation techniques and the challenges posed by laptop/notebook computers.

Workstation, chairs and other equipment will also be displayed.

The program includes a 30 minute break so that members and guests can continue their discussions and examine the displays whilst enjoying a tasty selection of hot savouries with wine, tea, coffee and juice.

Cost: Members of Ergonomics Society Free  
Non-members and guests \$25

To assure your place for the seminar, book promptly by ringing David Trembearth 0413 385 740, Phil Clark 9844-3091 or Steve Isam 9890-2422. Email bookings to vic@ergonomics.com.au

Members are asked to invite guests from their workplace and others with an interest in optimal office environment design and management. We look forward to meeting with you on the night.

Plans for our proposed Regional meeting at Puckapunyal on Thursday 20th May were well underway, when Puckapunyal advised that all their planned activities had been cancelled, to prepare for housing 600 Kosovo refugees on their site this coming week. The visit has been postponed for an indefinite period (possibly until October).

Wed 4 August: Medico-legal issues, with Michelle French: a day seminar.

Wed 15 September: Facilitating positive behaviour changes. Planning for success; how to facilitate positive change.

Tuesday 26 October: Injury Prevention (a professional development presentation)

**Thur 2nd December Two for the price of one!**  
**Vic Branch Annual General Meeting and Prof Devt Activity**  
**Handling Special Needs - Vision and Hearing**  
**disabilities**

Want to know more about the 1999 program?

Call David Trembearth (ph: 0413 385 740 fax: 9372-1542

email: ergon@netspace.net.au), Phil Clark (ph: 9844-3091 psclark@rie.net.au) or Steve Isam (ph: 9890-2422 fax: 9890-4102 atkinergonomics@bigpond.com)

#### PIE 'N SAUCE

Our first 1999 luncheon meeting was held on Wednesday 28th April at 200 Mt Alexander Rd Flemington (Mark Dohrmann's office). There were eleven people at this very good meeting. Two workplace problems were presented for group brainstorming.

Steve Isam showed us a short video of the problems faced by chicken vaccinators. These people jab thousands of chooks each day with essential vaccines. Each chook is picked up and presented chest up - wings spread - by an assistant - as the vaccinator whips the needle into the bird's breast muscle. They are large, strong birds, and the atmosphere is incredibly dusty. The problem is needlestick injury: about one assistant a day cops a needle in the hand. We talked over various "fixes": modified needles, modified methods, modified chooks. We discussed alternatives to the use of needles, protective gloves, lighting, etc. Steve (who explained why many "obvious" solutions couldn't be made to work) said that the suggestions were all very helpful.

Another problem was presented by Mark Hennessy, who described a customer service counter with a monitor embedded (at a shallow angle) in the desktop - good for customer eye contact, but ergonomically difficult. This was an opportunity to refresh each other through discussion of the competing significances of head angle, reflection control and customer eye contact. Mark summarised his recent work on the development of building design guidelines for reducing injuries associated with person/patient-handling activities.

Come to our next PIE meeting on Wed 9 June at 200 Mt Alexander Rd, Flemington. Two more practitioners will present a practical workplace problem for discussion, learning, networking, and sharing of ideas. Sandwiches and juice at 12:15 (the session starts at 12:30). Please email us (vic@ergonomics.com.au) or ring Tania (03 9376 1844) to let us know that you're coming, so we can cater for you. There is no charge.

# Spinal cord injury, thermoregulation & exercise

*Margaret Lacey* (s006442@student.uq.edu.au)

Margaret Lacey  
Human Movement Studies  
The University of Queensland

## ABSTRACT

Spinal cord injury impairs the thermoregulatory system, compromising the ability to maintain equilibrium at rest and during exercise. The extent of thermoregulatory impairment is dependent on the level and extent of the lesion. The ambient temperature of the environment, metabolism, clothing and physical activity will challenge the thermoregulatory system of a spinal cord injured person. Exercise improves the ability of a person with spinal cord injury to regulate their body temperature. Appropriate guidelines must be followed to accommodate the thermoregulatory impairment of this population.

## INTRODUCTION

Spinal cord injury results in an impairment of motor and/or sensory function in the trunk and/or extremities. People with spinal cord injury are classified as quadriplegic or tetraplegic, if the lesions is at the first thoracic vertebrae or above and paraplegic, if the lesion occurs below the first thoracic vertebrae. The level of impairment will differ depending on the site and nature of the lesion. People with a spinal cord injury have no neurological capacity in areas that are below a lesion and this includes the ability to contract muscle groups, to constrict and dilate vasculature and to control thermoregulatory mechanisms, (Fitzgerald, Sedlock and Knowlton, 1990; Petrofsky, 1992).

In everyday activities and during exercise, the metabolic reactions that occur in the body produce heat. The environment is also a source of heat. The mechanisms for dissipating heat include radiation, conduction, convection and evaporation. The coordinating centre for these thermoregulatory mechanisms is the hypothalamus and it is reliant on peripheral and central receptors to relay sensory information (McCann, 1996). The most effective mechanism to prevent overheating is sweating. The evaporation of perspiration from the skin, cools the cutaneous skin layers and the blood, via convective heat transfer, (Price and Campbell, 1997). Sweating is

controlled by sympathetic nerve fibres, which in the case of spinal cord injury, are inactive below the site of the injury. Thus people with spinal cord injury are at a significant physiological disadvantage when it comes to regulating body temperature. This disadvantage is magnified when the thermoregulatory system is stressed during physical activity.

## ENVIRONMENTAL CONDITIONS

The core temperature of a paraplegic or quadriplegic is easily affected by the ambient temperature due to the thermoregulatory impairment caused by the lesion, (Muraki, Yamasaki, Ishii, Kikuchi and Seki, 1996). Petrofsky (1992) found significant aural (inner ear) temperature difference between controls, paraplegics and quadriplegics after 30 minutes of passive exposure to temperatures above 35 °C. The subjects with spinal cord injury had significantly greater aural temperatures reflecting their decreased ability to dissipate heat. Differences in thermoregulatory capacity can also be seen between able bodied and spinal cord injured people at an ambient temperature of 25 °C, with the core temperature of spinal cord injured people being lower than that of able bodied counter parts, (Muraki, Yamasaki, Ishii, Kikuchi and Seki, 1996. At higher temperatures those with spinal cord injury may suffer from heat stress after shorter exposure, whereas in cooler temperatures, a greater rise in body temperature must occur before sweating is initiated. Thus a greater reliance is placed on the less effective dry heat exchange methods.

Decrements in work performance can occur in unacclimatised individuals once the ambient temperature has exceeded 22 °C, (Chad and Brown, 1995). The decrements not only affect performance but also the ability to make fine manipulations, judgements and in decision making. When the work performed in this environment is physiologically demanding the effect is increased, (Chad and Brown, 1995). For the individual with spinal cord injury and thus an impaired thermoregulatory system, the ability to perform simple tasks could be significantly impaired. The environment should be a consideration in the prescription of an exercise program, during work tasks and leisure

activities.

### REST AND TRAINING ADAPTATIONS

Price and Campbell, (1997) found that whilst resting at lower temperatures, such as 21 °C, the mean skin temperature of able-bodied and paraplegic athletes is similar. Over a wider range of ambient temperatures though, those with spinal cord injury are less able to maintain equilibrium (Muraki, Yamasaki, Ishii, Kikuchi and Seki, 1996).

Similar training effects occur in paraplegic and able-bodied athletes. These changes affect the cardiovascular system and the responsiveness of thermoregulatory mechanisms by increasing blood volume, increasing sweat rate, decreasing electrolyte loss, initiating sweating at a lower body temperature and decreasing perception of thermal stress, (McCann, 1996). These adaptations reduce the stress placed on the thermoregulatory system and support the need for regular exercise in the lives of people with spinal cord injury. Training also reduces the difference in thermoregulatory ability that causes women to be less successful in managing body temperature when compared to men, (Kenney, 1985).

### EXERCISE

In able-bodied subjects it is known that an increase in core temperature during exercise promotes blood flow to the skin of the inactive areas in order to dissipate heat, (Muraki, Yamasaki, Ishii, Kikuchi and Seki, 1996). Vasodilation can occur in the lower extremities in those with spinal cord injury but it is dependent on the level and extent of the lesion. Differences will be observed between individuals and must be taken into account when recommending activities for this population.

For those people with spinal cord injury who can not dilate and constrict their vasculature appropriately, blood pooling may occur and this may be a site of heat storage. Women with spinal cord injury may be at a further disadvantage due to the later onset and decreased sensitivity to sweating which can result in greater heat storage, (Kenney, 1985). A gradual increase in the skin temperature of the thigh is suggestive of heat storage in paraplegics who have a lesion above the first

lumbar vertebrae. This is due to little evaporative cooling and therefore minimal loss of heat from this area, (Price and Campbell, 1997). Davis, Servedio, Glaser, Gupta and Suryaprasad, (1990) found that functional neuromuscular stimulation of the lower limbs decreased blood pooling during arm-crank ergometry. Functional neuromuscular stimulation can be used to stimulate paralysed muscles aiding in ambulation, causing increases in strength, improving blood flow, reducing spasticity and increasing muscle bulk, (Kralj and Jaeger, 1994). This not only has thermoregulatory implications but also significant health benefits such as cardiovascular improvements, a possible decrease in the risk of deep vein thrombosis and an increased ability to achieve training effects.

When sweat rates for each region are measured, people with spinal cord injury have higher rates, sometimes double that of able bodied people, when working in a hot environment (30-40 °C), (Huckaba, Frewin, Downey, Tam, Darling and Cheh, 1976). Petrofsky, (1992) estimated that two thirds the sweat glands of the spinal cord injured participants were paralysed, yet a regional sweat rate six times that of able-bodied people was achieved. However this sweat rate was so high it was ineffective in heat loss, running off the body rather than evaporating. Although the regional sweat rate is higher in people with spinal cord injury, it must be noted that this is not overall sweat rate. Although the upper body may have higher than normal sweating capacity, in order to compensate for below the site of the lesion which has no sweating capacity.

Due to paralysis in the lower limbs most people with spinal cord injury utilise the upper body in exercise and activities of daily living. The use of the upper body places unique demands on the central nervous system as there is greater total peripheral resistance, increased heart rate and blood pressure and decreased stroke volume, (Davis, et al., 1990). For spinal cord injured people exercising the upper body in the heat, the thermoregulatory system will be compromised due to a reduced skeletal muscle pump, reducing venous return and affecting cardiac output. A reduced blood volume, due to fluid being lost to the intracellular space, affects blood concentrations, impairing the ability of the thermoregulatory system, (Sawka, Latza and Pandolf,

1989). The improvement in blood flow following training, prevents blood pooling in the lower extremity thus decreasing the storage of heat. Untrained people with spinal cord injury are at greater risk of heat stress when exercising the upper body in hot environments due, to the lack of training adaptations and acclimation.

When affected by heat, if free to do so, individuals make postural and clothing adaptations in order to compensate for the increased heat production, (Chad and Brown, 1995). Significant changes in posture are limited when wheelchair bound. If a uniform for work or sport is also imposed, performance can be decreased due to heat production. Dry clothing, whatever the weight, can impede heat reduction more so than the same material when wet, as evaporation only occurs when the material is saturated, (McArdle, Katch and Katch, 1994). Clothing should be light in colour, loose and made of a material that allows air to circulate and maximises skin exposure, (McCann, 1996). The habit of track athletes to wear skin tight outfits should be avoided for the spinal cord injured athletic population. The practice of wearing track pants by spinal cord injured people also reduces the convective heat exchange. The clothing used by competing athletes and other spinal cord injured people is an area which warrants future investigation.

The effect of medications on the vasodilative and vasoconstrictive ability of paraplegics must also be considered when prescribing exercise for spinal cord injured clients. Menard and Hahn (1991) found that a paraplegic man was hypothermic due to the effect of nifedipine, a calcium channel blocker. The same study also noted that the anticonvulsant dilantin, parasympathomimetic and adreno-blocking drugs could also affect thermoregulation.

#### RECOMMENDATIONS

When prescribing activities for the population with spinal cord injury it is necessary to be aware of the impaired ability to thermoregulate. The thermal stress placed on the person with spinal cord injury can be increased in hot environments and with activity.

When prescribing exercise and making recommendations for this population it is necessary to be aware of:

- The decreased ability to sweat and therefore reduced

heat loss below the level of the lesion.

- Use of water sprays to wet the body, or ice vests and collars to cool the body in order to reduce body temperature.
- The increased heat storage potential of the body parts below the level of the lesion.
- The thermoregulatory differences that exist between men and women
- The differences that exist between the untrained and trained individuals in their thermoregulatory ability. This highlights the benefits of regular exercise for those with spinal cord injury.
- The material used in clothing worn during competition or participation in work and leisure activities. The material should allow air to circulate between the material and the skin and it should be something that absorbs moisture easily.
- The use of functional electrical stimulation in order to create greater adaptations to exercise, reduce blood pooling and increase thermoregulatory ability.

#### REFERENCES:

- Chad, K.E. and Brown, J.M.M. (1995) Climatic stress in the workplace: Its effects on the thermoregulatory responses and muscle fatigue in female workers. *Applied Ergonomics*, 26(1): 29-34.
- Davis, G.M., Servedio, F.J., Glaser, R.M., Gupta, S.C. and Suryaprasad, A.G., (1990) Cardiovascular responses to arm cranking and FNS-induced leg exercises in paraplegics, *Journal of Applied Physiology*, 69(2): 671-677.
- Figoni, S.F. (1994) Spinal cord injury, cited in American College of Sports Medicine, *ACSM's Exercise Management for Persons with Chronic Diseases and Disabilities*, Human Kinetics, USA, 175-179.
- Fitzgerald, P.I., Sedlock, D.A. and Knowlton, R.G., (1990) Circulatory and thermal adjustments to prolonged exercise in paraplegic women, *Medicine and Science in Sports and Exercise*, 22(5): 629-635.
- Huckaba, C.E., Frewin, D.B., Downey, J.A., Tam, H.S., Darling, R.C. and Cheh, H.Y. (1976) Sweating responses of normal, paraplegic and anhidrotic subjects, *Archives*

## Electronic Resources

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*of Physical and Medical Rehabilitation*, 57: 268-274.

Kenney, W.L. (1985) A Review of Comparative Responses of Men and Women to Heat Stress, *Environmental Research*, 37: 1-11.

Kralj, A. and Jaeger, R. (1994) Functional Electrical Stimulation for Spinal cord injury, cited in Yarkony, G.M (ed) *Spinal cord injury: Medical Management and Rehabilitation*, Rehabilitation Institute of Chicago Procedure Manual, Aspen Publishers, USA.

McArdle, W.D., Katch, F.I. and Katch, V.L. (1994) *Exercise Physiology: Energy, Nutrition and Human Performance, 4th Edition*, Williams & Wilkins, USA.

McCann, B.C., (1996) Thermoregulation in spinal cord injury: the challenge of the Atlanta Paralympics, *Spinal Cord*, 34: 433-436.

Menard, M.R. and Hahn, G. (1991) Acute and Chronic Hypothermia in a Man with Spinal Cord Injury: Environmental and Pharmacologic Causes, *Archives of Physical Medicine and Rehabilitation*, 72: 421-424.

Muraki, S., Yamasaki, M., Ishii, K., Kikuchi, K. and Seki, K., (1996) Relationship between core temperature and skin blood flux in lower limbs during prolonged arm exercise in persons with spinal cord injury, *European Journal of Applied Physiology*, 72: 330-334.

Petrofsky, J.S. (1992) Thermoregulatory stress during rest and exercise in heat in patients with spinal cord injury, *European Journal of Applied Physiology*, 64: 503-507.

Price, M.J. and Campbell, I.G., (1997) Thermoregulatory responses of paraplegic and able-bodied athletes at rest and during prolonged upper body exercise and passive recovery, *European Journal of Applied Physiology*, 76: 552-560.

Sawka, M.N., Lutzka, W.A. and Pandolf, K.B., (1989) Temperature regulation during upper body exercise: able-bodied and spinal cord injured, *Medicine and Science in Sports and Exercise*, 1(5): S132-S140.

### CORNELL POSTURE STUDY

ITHACA, N.Y. -- Middle school students put themselves at risk for musculoskeletal problems when they work at a computer keyboard on a desktop instead of from an adjustable computer tray, according to a new Cornell University study.

"At traditional desktop workstations, these middle school students definitely

sat in at-risk positions for potential musculoskeletal problems when using computers," says Kathryn Laeser, who conducted the study for her Cornell Master's thesis last year. "They reduced their risk, however, when they worked at an adjustable, ergonomically designed workstation." Without any instruction, students consistently assumed better posture at the adjustable workstation and maintained that posture throughout keyboarding and mousing tasks, she says. The upper arm, in particular, was taken out of high-risk positions at the adjustable workstation.

However, although the improvements were statistically significant for the forearm, neck, wrist and trunk, they were only modest and did not fall into low-risk ranges, says Laeser, now a facilities planning consultant in San Francisco.

In the study, published in the winter issue of the "Journal of Research on Computing in Education" (Vol. 31, No. 2, pp. 173-188), 58 students in grades six and eight first used a keyboard and monitor on a desktop. Then they used a preset tiltdown keyboard system, consisting of a negative slope tiltdown keyboard tray and a mousing surface positioned closer to the student's body. The students' posture was assessed at both types of workstation arrangements using a standard observational measurement tool. The study was under the supervision of co-authors and professors Lorraine Maxwell and ergonomist Alan Hedge, both in the design and environmental analysis department at Cornell. Hedge had reported in 1995 that the lowered keyboard tray on a gentle, negative tilt away from the user puts 60 percent more typing movements within a low-risk zone for carpal tunnel syndrome.

In the latest study, Laeser also found that more students preferred working at the adjustable workstation.

Laeser's findings were similar to another recent Cornell study of elementary school children working at computers, published in "Computers in Schools" (1998, vol. 14, issues 3/4, pages 55-63). The researchers found that almost 40 percent of third to fifth graders studied used computer workstations that put them at risk for developing musculoskeletal problems. None of the 95 students studied scored within acceptable posture ranges. Laeser's study was supported by the College of Human Ecology at Cornell.

Related World Wide Web sites: The following sites provide additional information on this news release. Some might not be part of the Cornell University community, and Cornell has no control over their content or availability.

For a slide show summarizing the study, see

<http://ergo.human.cornell.edu/AHProjects/children1/ind ex.htm>

Papers presented at the 1998 **Queensland Mining Industry Health and Safety**

Conference are available at  
<http://www.qmc.com.au/papers.htm>

These papers include:

Brake, Rick "A New Generation of Health and Safety Protocols for Working in Heat"

Brain, Amanda "The People in the Process: Optimising the Person Job Fit to Achieve Safe Production"

Cram, Ken "Personal Exposure to Diesel Particulates"

Dawson, Drew "Sustained Wakefulness and Alcohol Intoxication"

Jonson, Keith "Unsafe Attitudes and Acts - A Psychological Explanation"

Joy, Jim "Safety Education Initiatives at The University of Queensland"

Knowles, Jim "Safety Management Systems, Friends or Foes?"

Langdon, Brian "Managing Health and Safety in Mines"

Luxford, Joe "Managing Contractor Safety"

Mallett, Cliff "Emergency Planning Simulations and Virtual Reality Techniques in Mine Emergency Management"

Roberts, Malcom "Using Modern Management Systems to Drive Behaviour to Genuinely Improve Safety (Not Just LTIFR)"

Robotham, George "Practical Application of the Critical Incident Recall Technique"

Stephan, Shane "Decision Making in Incident Control Teams"

Torlach, Jim "Mining Fatalities Inquiry - Western Australia - Opportunities and Initiatives"

**Georgia Tech's Center for Rehabilitation Technology**  
(<http://www.arch.gatech.edu/crt/crthome.htm>)

**The Barcelona Design Website**  
<http://www.bcndesign.org>

**Canadian Centre for Occupational Health & Safety**  
<http://www.ccohs.ca/oshanswers/ergonomics/ergonom-ics.htm>

**Workers Compensation Board of British Columbia**  
<http://www.wcb.bc.ca/>

**Center for Universal Design**  
<http://www.design.ncsu.edu/cud>

**E-BIOMED: A Proposal for Electronic Publications in the Biomedical Sciences**, Dr. Harold Varmus, Director, National Institutes of Health (USA)  
<http://www.nih.gov/welcome/director/ebiomed/ebiomed.htm>

# CybErg99

CybErg 1999, the second international cyberspace conference on ergonomics, will run from 15th September- 15th October 1999 at website <http://cyberg.curtin.edu.au/>.

The Early Bird registration for CybErg 1999, the second international cyberspace conference on ergonomics, closes 31st May 1999.

Early bird registration (registration before 31st May 1999) will cost only \$AUD75 (about 5,500Yen, 45 Euro, 50 USD) - amazingly cheap for a high quality international conference.

Registration from 1st June 1999 will cost \$AUD110 - still amazingly cheap.

### Prizes for Best Papers

CybErg 1999 will be awarding Gold, Silver and Bronze prizes for the best papers. The best paper prizes are sponsored by Elsevier Science publications. The Gold award winner will get a one year subscription to the International Journal of Industrial Ergonomics, a refund of registration costs and a certificate. Silver and Bronze award winners will also get a subscription to the International Journal of Industrial Ergonomics and a certificate.

### Prizes for Best Participation

We will also be awarding Gold, Silver and Bronze prizes for the best contributors to the discussions. The best contribution prizes are sponsored by Liberty Mutual. The Gold award winner will also get a one year subscription to the International Journal of Industrial Ergonomics, a refund of registration costs and a certificate. Silver and Bronze award winners will also receive a refund of registration costs and a certificate.

### Live Chat on Fridays

There will be 3 periods each Friday where we will encourage people to participate in live discussion at the conference. The three periods will be set to allow business hours discussion in the Asia, Africa/Europe and Americas time zones. People from other time zones could also join in 'after hours'. As each period will probably be 2 hours duration, Gymbreak is sponsoring this feature to remind you about not staying at the computer too long.

Please register now via our world wide web site <http://cyberg.curtin.edu.au>

## PROFESSIONAL INDEMNITY INSURANCE

Available to Members of ESA Inc.

As from 1 October 1998 International Insurance Brokers, Aon Professional Services, South Australia, have advised lower premiums for the Professional Indemnity Insurance Scheme. The scheme is open to all ESA Members, Professional Members and Life Members but not Affiliates.

Set out below is an example of the competitive rates for \$1,000,000 cover:

Gross annual income	Annual premium
up to \$150,000	\$605 which includes Stamp Duty & Brokers Fee
\$150,001 - \$250,000	\$827 which includes Stamp duty & Brokers Fee
\$250,001 - \$500,000	\$1,160 which includes Stamp duty & Brokers Fee

Special Conditions: Year 2000 Exclusion on all policies.

Note: The insurer has agreed to allow a 20% discount for part-time practitioners where their income is less than \$10,000.

Limit of Indemnity is \$1 million, any one claim and \$2,000,000 in the aggregate.

Cover is also available for higher Limit of Indemnity of \$2,000,000 to \$10,000,000.

Policy extensions automatically included : Cost of Disciplinary Inquiries, Breach of Fidelity - \$100,000, Defamation, Loss of Documents, Fraud & Dishonesty, Intellectual Property, Trade Practices Act, Joint Venture Liability, Partners Previous Business - incoming and outgoing, Prior Corporate Entity Continuity of Indemnity Period of Grace, Automatic Reinstatement, Automatic Run-off Cover.

Please note that the premium rates will vary slightly for each state with stamp duty. These rates are based on South Australia's stamp duty of 11%.

For further information and proposal forms contact:

Christine Stone

Ergonomics Society of Australia Inc, Canberra Business Centre, Bradfield St, DOWNER ACT 2602

Ph: (02) 6242 1951 Fax: (02) 6241 2554

Email: [esa@interact.net.au](mailto:esa@interact.net.au)

# Conference Calender

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## 1999

June 6-9 14th annual Int. Occupational Ergonomics and Safety conference, Orlando, FL, USA. Contact Prof. Gene Lee, Dept. of Ind. Engineering, Univ. of Central Florida, Orlando, FL 32816; GLEE@mail.ucf.edu

June 15-17, TQM and Human Factors, Linkoping, Sweden. email [piajo@udv.liu.se](mailto:piajo@udv.liu.se); fax: +46 13 122299

June 16-19 European Conference on Transport Psychology, Angers, FRANCE. Contact Secretariat AEPSAT, BP808, Place Andre Leroy 49008 Angers Cedex 01 FRANCE; [europsyt@uco.fr](mailto:europsyt@uco.fr); [www.inrets.fr](http://www.inrets.fr)

June 21-23, People in Control - International Conference on human interfaces in control rooms, cockpits and command centres, Bath, UK. Email: [PIC99@iee.org.uk](mailto:PIC99@iee.org.uk); <http://www.iee.org.uk/Conf/PIC99>

August 8-13. International Society of Biomechanics Congress. Calgary, Canada. Contact: Ph. +1 403 220 6229, Fax +1 403 284 4184, email: [mastroh@acs.ucalgary.ca](mailto:mastroh@acs.ucalgary.ca), <http://www.kin.ucalgary.ca/isb99>

September 15-17, European Symposium on Safety in the Modern Society Helsinki FINLAND. Contact Ms Kristiina Kulha, FIOH, Topeliuksenkatu 41 a A, FIN-00250, Helsinki FINLAND; [Kristiina.Kulha@occuphealth.fi](mailto:Kristiina.Kulha@occuphealth.fi)

September 27- October 1, 43rd Annual meeting of Human Factors and Ergonomics Society, Houston. [Hfes@compuserve.com](mailto:Hfes@compuserve.com) <http://hfes.org>

October 11-13th, 35th Annual ESA Conference. Freemantle, WA. Contact Keynote Conference, PO Box 1126, West Leederville, WA 6901. Ph +61 8 9382 3799

Fx +61 8 9380 4006. Email: [keynote@ca.com.au](mailto:keynote@ca.com.au).

## 2000

March 19 - 22 Fatigue Management Alternatives to Prescriptive Hours of Service

"Strategies for Programme and Promotion Evaluation", Fremantle. Tel 618 9322 6906 Fax 618 9322 1734 Email: [conwes@congresswest.com.au](mailto:conwes@congresswest.com.au)

July 23-28, Stockholm, XXVII International congress of psychology. <http://www.icp2000.se>

IEA 2000 29 July-4 August 2000 in San Diego, California,

USA. Contact IEA/HFES 2000, HFES, PO Box 1369, Santa Monica, CA 90406-1369, USA; Email: [HFES@compuserve.com](mailto:HFES@compuserve.com) <http://iea2000.hfes.org>

August 22nd-25th, Asia Pacific conference of computer human interaction, S.E. Asian Ergonomics Society conference, Singapore. Email [myklim@ntu.edu.sg](mailto:myklim@ntu.edu.sg).

27 August - 1 September 26th ICOH International Conference, Singapore.

Contact Secretariat ICOH2000, c/o Dept of Community, Occupational and Family medicine Faculty of Medicine MD3, Lower Kent Ridge Road, Singapore 119260.

Oct 9 - 11, 2000, **ESA 2000** Conference, Adelaide

## 2002

August 3-8, 4th World Congress on Biomechanics, University of Calgary, Canada.

## Information to Contributors

### SUBMISSION DEADLINES

The deadline for each issue is the 15th of the previous month **the deadline for the August issue is July 15.**

### CONTRIBUTIONS

Contributions to Ergonomics Australia are always welcomed and encouraged.

The activities, achievements, experiences, views and opinions of Members are always of interest.

These can take the form of letters, notices, notes, commentaries and articles.

Graphics (photos, illustrations, drawings, computer graphics etc) are particularly welcome and should be camera ready. Photos need not be black and white and negatives are not required.

The preferred form of submission is via email, either in the body of a message, or as an attachment. Files may also be mailed on floppy, (or Zip disc if very large). Virtually any format of files can be accommodated. Otherwise contributions should be printed in a large (14 pt preferred) non-serif font (such as Helvetica) and faxed to 07 3365 6877. Printed pages of similar specification may also be sent by post. Handwritten submissions will only be accepted in exceptional circumstances.

Any enquires about contributions should be directed in the first instance to the Editor.

## Information to Advertisers

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All advertising enquires should be directed to the Federal Office of the Society.

Contact:

Ms Christine Stone

tel: 02 6242 1951

fax: 02 6241 2554

email: [esa@interact.net.au](mailto:esa@interact.net.au)

9am - 1pm Monday to Thursday and 9 - 12 on Friday

### SIZE

The finished page size of the Newsletter is B5 (250 x 176mm)

Printed column sizes are 210 x 152mm (double) or 210 x 72mm (single).

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Rates for enclosures (subject to change in 1999)

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Enclosure requiring folding \$420

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