## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editorial</td>
<td>2</td>
</tr>
<tr>
<td>From the Internet</td>
<td>3</td>
</tr>
<tr>
<td>President's Column</td>
<td>4</td>
</tr>
<tr>
<td>IEA Column</td>
<td>6</td>
</tr>
<tr>
<td>Talking Point 1</td>
<td>8</td>
</tr>
<tr>
<td>Australian Standard</td>
<td></td>
</tr>
<tr>
<td>4024.1—2006 Safety of Machinery</td>
<td></td>
</tr>
<tr>
<td>Mike Stevenson</td>
<td></td>
</tr>
<tr>
<td>Talking Point 2</td>
<td>14</td>
</tr>
<tr>
<td>Timetables: a letter for your editor</td>
<td></td>
</tr>
<tr>
<td>Robert N Forsythe</td>
<td></td>
</tr>
<tr>
<td>Talking Point 3</td>
<td>15</td>
</tr>
<tr>
<td>In conversation</td>
<td></td>
</tr>
<tr>
<td>Jeffrey Frith</td>
<td></td>
</tr>
<tr>
<td>Article</td>
<td>17</td>
</tr>
<tr>
<td>Macro and micro ergonomics</td>
<td></td>
</tr>
<tr>
<td>in relation to NSW Police</td>
<td></td>
</tr>
<tr>
<td>Workplace stress disorders</td>
<td></td>
</tr>
<tr>
<td>Neil L Adams &amp; Neil D Adams</td>
<td></td>
</tr>
<tr>
<td>Book Review</td>
<td>28</td>
</tr>
<tr>
<td>Beyond human error: Taxonomies and Safety Science</td>
<td></td>
</tr>
<tr>
<td>Brendan Wallace &amp; Alastair Ross</td>
<td></td>
</tr>
<tr>
<td>Shirleyann Gibbs</td>
<td></td>
</tr>
<tr>
<td>Ergonomics Crossword</td>
<td>30</td>
</tr>
<tr>
<td>Noticeboard</td>
<td>32</td>
</tr>
<tr>
<td>Conference Calendar</td>
<td>37</td>
</tr>
<tr>
<td>Information for Contributors</td>
<td>38</td>
</tr>
<tr>
<td>Information for Advertisers</td>
<td>38</td>
</tr>
<tr>
<td>Ergonomics Australia On-Line (EAOL)</td>
<td>39</td>
</tr>
<tr>
<td>Caveats</td>
<td>39</td>
</tr>
</tbody>
</table>

The Official Journal of the HFESA
Human Factors and Ergonomics Society of Australia

Volume 21, Number 1 (March 2007), ISSN 1033-875

Editor
Dr Shirleyann M Gibbs
Email: shanng@optushome.com.au

National Secretariat
The Human Factors and Ergonomics Society of Australia Inc.
PO Box 7848 Balkham Hills BC NSW 2153
Tel: +612 9680 9026 Fax: +612 9680 9027
Email: secretariat@ergonomics.org.au
Office Hours: 9.00am - 4.30 pm, Tues, Wed and Thursday

HFESA Website: http://ergonomics.org.au

Design and Layout
Acute Concepts Pty Ltd Tel: 03 9381 9696

Printer
Impact Printing

Promoting systems, space and designs for People
Editorial

We welcome 2007 with a new President, Executive and HFESA Board to continue the development of ergonomics awareness in the professional, academic and commercial life of Australia. A major part of the society’s success will depend on the individual efforts of HFESA members who support various initiatives mooted by the activists in our ranks. The editor hopes that members will be encouraged to contribute something to these pages in time for the published deadlines! The readership is increasing and this is our discipline’s promotional tool in the wider world … especially via the online version. It is worth noting that this international presence is generating an increasing level of interest.

Whilst this column and various sections were being edited for the December edition of the journal there was an unexpected hitch as the anticipated papers were not ready for publication. Given the Christmas—New Year holiday period it was not possible to do other than postpone the edition. Neil Adams came to the rescue when asked to revamp his conference paper for publication in lieu of earlier contributions. It addresses a significant issue in relation to incident and cumulative post-trauma stress in the police force. The material may be readily extrapolated to address a myriad other employment situations that ergonomists may be called upon to alleviate.

Members may be aware of an ABC Four Corners program in early February that featured particular elements of a demoralizing workplace culture in the Victorian Police Force and the conflicting viewpoints of the protagonists. This program highlighted the differences that attitudes and a cultural environment can impose on people and systems as well as processes. It was a disturbing confirmation that the problems outlined in Neil’s paper are still unresolved in many instances. The ABC program offered interesting comments about the role of powerful unions in exerting self-protective power and control on politicians … especially pre-election time and how easy it can be to suppress unwanted information. In the process people can suffer extremely stressful workplace emotional abuse than may lead to eventual job losses for any who dare to fight the entrenched systems. This is perhaps one of the more critically evolving areas of concern in twenty first century ergonomics when considering how to incorporate human factors in bureaucratic systems management. There are continuing references to these problems in the national media.

Don Woodland, a senior Salvation Army officer who served in Vietnam and has since been called to many major incidents such as fires, mine accidents, major bus crashes, the Thredbo hillside collapse and the Port Arthur horror, to name just a few from Queensland, New South Wales, Victoria and Tasmania. In his recent book, Picking up the Pieces, he describes how he came to develop a whole new tradition of victim and rescuer support programs … that relied on the immediate trauma support of having someone just sit with the rescuers as they took a break and/or when they came off duty. Just having someone there as a silent and sympathetic companion over a cuppa, if people were not yet ready to talk about their experiences, has proved the first important step in later coping with horrific events. If that support person is then ready to listen as soon as the involved personnel are ready to talk, it has been shown to be far more effective than the popular media generated concept of announcing that anyone even remotely associated with an event will be offered immediate counselling. Genuine psychological counselling may be necessary for some intimately involved persons at a later stage. Don Woodland believes that trauma counselling and post-event psychological counselling are vastly different in intent, approach and practice.

Mike Stevenson also came to the rescue for this edition. He was concerned that some of the significant issues at the recent conference workshop on safety of machinery had not had time to be thoughtfully addressed. So he too has prepared a contribution for Talking Point. Finally a further contribution to Talking Point arrived from Jeff Firth as this edition was in final preparation. It would be much appreciated if members interested in these issues would make even a short response for publication.

David Caple and Robin Burgess-Limerick have also supplied the regular IEA and HFESA news columns so this edition should be delivered by early March. Please check the society’s website to ensure your current address details are available for the mailout … at least the onus is now on members to check a direct link rather than a second or third-hand step to the secretariat’s database.

Robin Burgess-Limerick has a research interest in the ergonomics of mining safety and recently conducted a seminar on this topic in the Hunter Valley, New South Wales. He has offered to organize the relevant papers for a special edition of Ergonomics Australia that will follow this one. This will mean that the editor will have a little more time to seek material for subsequent issues this year. As hardly anyone takes any notice of the published deadlines for each edition, the notice in EA will not be altered … please just submit regardless … and as soon as possible! Remember, a refereed journal is not generated overnight or subject to instant email delivery from a word processor—there are many weeks of collation, review, editing and corrections, and finally the editor’s compilation in a Word file that can be sent to the publisher for design layout and
typesetting, sent to printer, collated with the cover and then to the mail house for postal distribution as a professional product.

Recipients of the journal may notice that a discrepancy crept into the system when the schedule was interrupted last year. The date of the quarterly journal remained accurate but advanced a Volume number mid-year! It was not until the Christmas holiday period that the secretariat noticed the jump which showed in the EAOL online listing ... and drew Robin’s and my attention to the fact. Robin is adjusting the volume number online but we realise that this might confuse recipients of the hard copy if they attempt to match hard copy and corrected EAOL details. So we agreed to readjust the numbers and alert you all to the error which will now be corrected with first issue this year.

Belated best wishes for the coming year and a further request for someone out there in each state and territory to take on a much needed voluntary role of soliciting local contributions and promoting the journal to the wider community from their local ergonomics society branch. The editor would like to see this journal set on a path of a safe and sustainable flow of contributions before she dies! There have been many valuable papers in the past and the veterans remain the most reliable source ... come on you fresh young ergonomists, we need the stimulation of your input!

Shann Gibbs PhD
Editor

From the Internet
The Tablecloth – A true story from Pastor Rob Reid.

A brand new pastor and his wife, newly assigned to their first ministry, arrived in early October to reopen a church in suburban Brooklyn. They were excited about this opportunity even though they could see that the church was very run down and needed much work. They set themselves a goal to have everything done in time to hold their first service on Christmas Eve. They worked hard on all the tasks that needed to be done ... such as repairing the pews, plastering and repainting the walls and cleaning the floor. By December 18 they were ahead of schedule and just about finished. On December 19 a terrible tempest—a driving rainstorm—hit the area and lasted for two days.

On December 21 the pastor went over to the church. His heart sank when he saw that the roof had leaked, causing a large area of plaster, about 20' x 8', to fall off the front wall of the sanctuary just behind the pulpit, beginning about head high. The pastor cleaned up the mess on the floor, and not knowing what else to do but postpone the Christmas Eve service, headed home. On the way he noticed that a local business was having a flea market type sale for charity so he stopped in. One of the items was a beautiful, handmade, ivory coloured crocheted tablecloth with exquisite work, fine colours and a Cross embroidered right in the centre. It was just the right size to cover the hole in the front wall. He bought it and headed back to the church.

By this time it had started to snow. An older woman was running from the opposite direction to catch a bus. She missed it. The pastor invited her to wait in the warm church for the next bus that was due 45 minutes later. She sat in a pew and paid no attention to the pastor while he got a ladder and hangers to put up the tablecloth as a wall tapestry. The pastor could hardly believe how beautiful it looked and it covered the entire problem area.

Then he noticed the woman walking down the centre aisle. Her face was like a sheet ... "Pastor," she asked, "where did you get that tablecloth?"

The pastor explained. The woman asked him to check the lower right corner to see if the initials, EBG were crocheted into it there. They were. These were the initials of the woman, and she had made this tablecloth 35 years before, in Austria. The woman could hardly believe it as the pastor told how he had just gotten it. She explained that before the war she and her husband were well-to-do people in Austria. When the Nazis
President’s Column

Firstly, let me express my sincere thanks to the organisers of the excellent 2006 Sydney conference. It is a big job, and in this case there were many hands, thank you to all. Don’t forget to start planning to attend next year’s conference in Perth; 26–28 November, 2007 at the Aquarium of Western Australia (see www.aqwa.com.au). Keynote speakers will be Prof. Rhona Flin (UK) Safe, productive work in the offshore oil and gas industry: A review of human factors—crew resource management, safety culture, leadership; and A/Prof Maureen Dollard (SA) Health, satisfying work for young Australians: A review of human factors in the design of work in service and other industries. Perth in summer is hard to beat; I look forward to seeing you there.

I also am very grateful to the outgoing executive. It has not been a smooth period, and they had to spend much time on seemingly unproductive issues. However, their efforts have provided a firm foundation for the next phase of the society’s development (more about that in a moment). One of the major activities of the last executive, and the board, has been developing and implementing an Information and Communication Technology strategy for the society in conjunction with CHISIG affiliate Regina Huntington. These efforts are now starting to bear fruit. You will know that it is has been possible to pay your membership fees on-line for some time, and if you pay a visit to the public website (ergonomics.org.au), you will see many improvements and additions. These include, I note with some satisfaction, 10 years of Ergonomics Australia On-Line. The current society constitution can also be downloaded from the publications page. The web page also provides a new set of email addresses for board members. For example, email to me regarding society business should be sent to president@ergonomics.org.au. Mail sent to these addresses will also be copied to the secretariat, and be archived. One of the other major advances which are not evident to members at large is an admin page through which the secretariat manages the (now accurate) database of members.

Another important new development is the provision of branch administration pages accessible by the elected executive of each branch. These pages provide the branch committees with the ability to directly access the members’ database for contact details for their state members, and to send email to all branch members from the webpage. (Similarly, the national executive is now able to search that data base, and send email to all members). The branch administrative pages also provide the ability for the branch executive to place information about forthcoming branch events onto the society website calendar.

Shann Gibbs
A second improvement which you will notice if you visit the members’ area of the website is that it is now much easier to locate contact details for other members. You could even print the information by state if you really wanted to. The catch is that information is only available for those members who have elected to have these contact details available to other members.

For both these functions to have the maximum benefit in facilitating communication between members it is important that details remain up to date. Please, visit the website, login to the members’ area, and check that your details are up to date. If you have forgotten your username (your member number) or password, just click on “member login” and you will have the opportunity to request your details be emailed to you. You need to supply the email address currently in the members’ database for this to work. If all else fails, email the secretariat@ergonomics.org.au and Pauline will be happy to send you the details you need.

Now, while you are in the members’ area, select my profile. You will see you have the option, if you are a professional member, of having an entry listed in the public website under the find a professional member option (publish to public website). All members have the option of having an entry in the database available to other members (publish to members area). The information listed is: name, organisation, address (W), phone (W) & email. Please consider carefully before electing not to allow any details to be published to members.

A second initiative of the previous executive which is only now gaining real momentum is a strategic planning process. This is not going to be just a paper exercise with a document on the shelf as the outcome. The process was sparked by a desire to determine the best way/s to use some of the reserves of the society to further the aim of the society, that is to advance the science of human factors and ergonomics in Australia by promoting research and education in ergonomics and the application of its principles, and the goal of the current executive (myself, General Secretary Angela Summers [WA], and Treasurer Margaret Cook [Qld]) is to make sure this happens. The planning process will involve as many members and interested outside parties as possible. HFESA Fellow and past-president Verna Blewett and HFESA Member Andrea Shaw have volunteered to facilitate the process of gathering these contributions through a series of workshops to be held in each state early in 2007, and will be assisting the board in developing the plan. The aim is to have a strategic plan which not only sets out actions by which the aims of the society may be achieved, but also determine the priorities attached to each, and importantly, identifies people willing to contribute to making the actions happen. There will be a formal invitation to members to participate—but if you have a great idea or other input, don’t delay, send Verna (verna@newhorizon.com.au), Andrea Shaw (andrea@shawidea.com.au), or me an email.

The incoming HFESA executive will also be continuing to give priority to enhancement of the website. The plans include on-line registration and payment for branch functions, and access to previous conference proceedings. When the strategic plan is in place we will have further direction, but in the meantime our other priorities will be to assist branches with professional development activities and support the further development of Ergonomics Australia.

Best wishes,
Robin Burgess-Limerick PhD
President HFESA

Vol 21, Number 1 (March 2007)
IEA Column

[Ed: The following news is kindly adapted with permission from the IEA President’s letter to all Presidents of the 42 Federated Societies and IEA Councilors. It was received in time for the intended December edition which had to be postponed.]

I am pleased to send my sixth letter to you to wrap up our IEA communication for the first 6 months of the new Executive. It has been a very busy but productive time as we plan for the multiple projects as well as for the IEA Congress on August 9-14, 2009 and the next Council meeting on August 25-26, 2007 in Boston. I hope that you have this in your calendar!

Announcement of new Chairpersons for IEA Standing Committees

I would like to announce some changes to the IEA Executive Committee following the resignation of our Science, Technology and Practice (STP) Chair, Peter Buckle from the UK. Unfortunately Peter has had to contend with a range of recent unexpected changes at his workplace which has increased his workload significantly. We are very sorry about this as Peter’s knowledge, ideas and passion will be greatly missed by the IEA Executive Committee.

I am pleased to announce that Halimahtun Khalid has accepted the role as Chair of the STP Committee and has already been very active particularly in her work with the Chairs of the Technical Committees. Mahtun has been the Chair of the International Development Committee (IDC) and has done a fantastic job in promoting new ergonomics societies to be formed and consider IEA membership. More on that later!

I am also very pleased to announce and welcome Marcelo Soares from Brazil to the Executive Committee as Chair of the IDC. Marcelo has already accepted the role of Chair of the 2012 IEA Congress in Brazil and this IDC role for the next 3 years will enable him to network widely at an international level. I am pleased to note another first with this Executive in having Marcelo as our first EC member in 50 years from Latin America.

Pascale Carayon is the first female into an elected position as Secretary General and for the first time we have three women on the Executive Committee: Pascale Carayon, Lina Bonapace and Mahtun Khalid. Mahtun is also the first woman from the Asian region to be on the Executive Committee.

New Ergonomics Societies

1. We are delighted to hear that our colleague, Samson Adaramola has been elected the first national President of the Ergonomics Society of Nigeria (ESN) this week. Many of us met him in Maastricht and we offer our best wishes and support for this new Society in Africa. Our friends in the Ergonomics Society of South Africa have kindly offered to mentor the ESN in developing their constitution and programs to prepare them for IEA membership in the future.

2. It is also exciting to see the emergence of a new ergonomics society in the Middle East region. We already have active societies in Israel and Iran. The new group are considering the name of The Arabian Ergonomics Society and planning to form an inaugural committee with representatives from different countries in this region. We also wish them well and look forward to them applying for IEA membership in the future.

3. Within Southeast Asia, a new ergonomics society has been formed—Human Factors and Ergonomics Society Malaysia (HFEM), through the initiative of Mahtun who is also the Pro-tem President of HFEM. Currently, there are 4 ergonomics societies in Southeast Asia (Indonesia, Philippines, Singapore, and Thailand). Only the Philippines Ergonomics Society has joined the IEA, and we hope the rest will consider too.

New IEA Technical Committees

Our new STP Chair, Mahtun, has commenced her role to review all the existing Technical Committees and also to invite nominations from IEA members for new Committees that reflect further areas of our domain. I encourage you to inform your Federated Society members to have a look at the list of the current TCs on the IEA website (http://www.iea.cc/events/technical.cfm). If they would like to propose another TC could they email Mahtun (mahtun@damai-sciences.com)? Alternatively if they would like to find out more about any of the existing TCs just email the TC Chair listed on the website.

As way of forward notice, the EC are proposing a voting item for our Council meeting in August 2007 to introduce a limit to the term for a person as Chair of a TC. Our current Rules do not specify a limit and we are keen to maintain vitality with these roles in the same way as we specify a limit for the Executive Committee members.
Ergonomics Competencies and Accreditation of Education Courses

The IEA is reviewing the competency statements for ergonomists and the Accreditation requirements for education in ergonomics. The current documents can be found on the PSE section of the IEA website if your Society is interested. I am grateful to Tom Smith from USA and Bob Bridgers from the UK who have agreed to lead a review of these documents and to offer their suggestions for enhancements. The Executive is very conscious that education in ergonomics needs to reflect the range of education modes. These include distance learning and e-learning as well single campus based educational programs. It is also a requirement that the diversity of the domain of study, research and application can be covered through our education program expectations.

If any member of your Society involved in competency assessment and/or interested to contribute to the review of the educational requirements could you please make contact with Pascale Carayon, Secretary General (carayon@engr.wisc.edu)?

EQUID – Update in early 2007

The EQUID Chair, Lina Bonapace has been very busy developing the Road Map and resource materials for the EQUID project with her sub committees. We propose to dedicate a large section of one of these Letters from the President to this topic early next year. This will enable all Council members to be fully informed and aware of the EQUID potential directions prior to the meeting in August.

Japan and China visit

I am looking forward to combining a private trip to Japan and China at the end of December with meetings in Tokyo with the Japan Ergonomics Society and the Human Ergology Society. I will then be travelling to China where I will meet with the Chinese Ergonomics Society in Beijing and the IEA 2009 congress committee.

Prof. David C Caple
IEA President

Gavriel Salvendy’s Award from China

On behalf of the IEA I would like to recognize and congratulate Gavriel Salvendy who has recently received the Friendship Award which is the highest Science and Technology award in the PR China. He was presented with this award by Premier Wen Jiabao in the Great Hall of the People in Tiananmen Square. Gavriel tells us that he discussed the role of ergonomics in the further revitalization of China with the Premier. This is a nice introduction for our IEA 2009 Congress in Beijing. Congratulations Gavriel!

IEA Dues review feedback

The IEA Treasurer Min Chung has been collecting data from a sample of Federated Societies in relation to their total membership income and the membership numbers to assist us to determine if a new method can be found for calculating IEA dues that makes an allowance for inflation. Thank you to those Societies who have been approached and responded. If your Society would like to contribute your information can you email Min (mkc@postech.ac.kr)?
Talking Point 1
Australian Standard 4024.1—2006
Safety of Machinery

Mike Stevenson PhD
Mike Stevenson Ergonomics

Background
An Australian Standards committee was set up in 1989 to draft an Australian Standard on Safeguarding of machinery. The Ergonomics Society of Australia was represented on this committee from the beginning. The resulting Interim Australian Standard 4024.1 Safeguarding of machinery Part 1: General principles was published in 1992. It was closely based on the British Standard 5304:1988 Safety of Machinery, the main difference being the inclusion of a prominent early chapter on ergonomics. A revised and fully fledged AS 4024.1 appeared in 1996. Further consideration by the committee has led to a completely different approach in the latest version of the standard, which was put out for public comment in October 2005. Members of the Human Factors and Ergonomics Society of Australia were advised of the availability of the draft by Tony Payne, the current HFESA representative, through the Ergo List. The new AS 4024.1—2006 Series, Safety of machinery was published in June 2006.

Content of the Standard
The 2006 version of AS 4024.1 is quite different from the superseded standard. It is basically a collection of 26 European or ISO standards, with some modifications for the Australian context, including appropriate references to other Australian standards. The result is over 500 pages in a loose-leaf binder, and a retail price of $214.72. The new standard is performance based, and does not include specific examples of guarding designs. The superseded standard does contain a lot of useful examples of guarding and ideally should be available as an introduction. A full list of the 26 parts of the standard and their numbers is available through the website of Standards Australia, and a brief summary is as follows.

The first six parts cover terminology, general principles, risk assessment and ergonomic principles. The next six parts deal with safety related parts of control systems, guard and interlock switch design, prevention of unexpected start-up, and emergency stop switches. There are then seven parts providing specialised anthropometric data including safety distances to prevent accidental access to hazards, dimensions for access where required for maintenance, and minimum gaps between moving parts to prevent crushing. The remaining seven parts cover aspects of ergonomic design which should guide the design of machinery, and standards for signs and signals.

The amount of ergonomics material in the standard is notable and should have a positive impact on designers. It will also provide support for ergonomists in getting their proposals accepted, and introduce work opportunities for ergonomists to assist in the interpretation of those parts of the standard.

Comments on Parts Related to Anthropometry
Most of the dimensions provided in these parts fall into the category of dynamic anthropometry, i.e. they are not derived from static anthropometric measurements, but have been determined experimentally. For example, Part 1801 deals with the possibility of contacting hazardous parts of machinery by reaching over protective barriers, or through guard openings. Experimental methods and apparatus for obtaining such data were described by Booth and Thompson (1980 and 1981).

Being based on European standards, it should not be surprising that the data was obtained with European populations. There have been valid concerns in the past that common Australian factory populations may contain a substantial proportion of people of south east Asian origin who would be poorly represented by European data. This is a particular concern with data for ability to reach through guard openings. In cases where the arms of Europeans would be blocked at the elbow, giving a reach distance determined by forearm length, the arms of south east Asian women may pass through the same gaps, giving a greater reach distance since it would be determined by full arm length. It might be supposed that since Europe has also been subject to substantial migration in recent decades, this should be reflected in recent data. Ultimately, we may have globalised data. Unfortunately, the data in the standards is not necessarily recent.

Considering Part 1801: Safety distances to prevent danger zones being reached by the upper limbs, we find that the tables came from an ISO standard issued in 1993. The first two of these tables, Reaching Over Protective Structures, give safety distances for a range of heights of barrier and heights of the hazard. The first table is to be applied where there is a low risk from a friction or abrasion hazard. The origin of this table is a German (DIN) standard issued in 1984 in which it is claimed that the distances given would protect 95% of the German population. Its use in the British Standard 5304:1988, was criticised by Thompson (1989), who showed that it would not protect 95% of the British population, and pointed out that leaving 5% at risk was not desirable. We can only assume that the use of this data over the past 20 years has not resulted in any significant injuries. The new Australian standard follows the 1993 ISO standard in also providing the second and more stringent table for...
“It just makes good sense to implement ergonomic workstations that are easily adjustable.”

- Users can find the desk height that works best for them
- Added flexibility for different occupational tasks
- Sit or stand while working
- Improves employee retention, health, morale and satisfaction
- Dynamic, productive and healthier way to work
- Quick, effortless and easy adjustment regardless of the weight on the work surface
- Reduced absenteeism and employee turnover
- Increased productivity (employees can take “micro-breaks” without leaving their workstations)
- Reduced costs: Ergonomic programs can reduce workers compensation claims

Alternating between sitting and standing positions is the most effective way to maintain productive workflow
reaching over protective structures for use where there is a high risk from an entanglement hazard. It would seem sensible to always use the second table.

A problem with data which has not been updated recently is that any secular change may not be represented. The main problem is that the size of people has been increasing. Their increased stature suggests ability to reach further over barriers, while their increased waist measurement suggests that recommended openings for access may not be adequate. The data in the standard may be considered a starting point in design, but some try-outs should also be made with the workers concerned before production starts, and management should be alert to recruitment of new staff whose dimensions might put them in danger, thus calling for modification to the guarding hardware.

Inherently Safe Design

Part 1202 Technical Principles, describes factors to be considered in the design of machines which can lead them to being inherently safe. This is in line with recent efforts in Australia to promote safety by design. A summary of these factors is as follows.

- Geometric factors, e.g. the machine shape should allow good visibility for operators, considering all of their tasks, provide space to avoid crushing hazards, avoid sharp edges and corners, protruding parts, and openings which might trap parts of the body.
- Physical aspects, e.g. limiting actuating force, mass or velocity of moving parts, emissions of noise, vibration, hazardous substances and radiations.
- Ensure materials chosen have suitable properties and are well within their limits of stress by design calculation, or by overload protection devices.
- Choose low hazard technologies, e.g. pneumatic or hydraulic rather than electrical systems for use in potentially explosive atmospheres.
- Use positive mechanical action of one component on another, e.g. positive action interlock switches.
- Ensure stability of machine, considering transport & installation.
- Ensure safe and easy maintainability, considering access, and human capabilities.
- Apply ergonomic principles, considering operator-machine interface, posture, ease of operation, and environment.

- Prevent hazards from power sources including electricity, high pressure air or hydraulic fluid.
- Avoid all possible hazards possibly arising from the control system, e.g. unintended or unexpected start-up or speed change.
- Minimise the probability of failure of safety functions, e.g. by use of reliable components, redundancy and fail-safe components.
- Limit exposure to hazards, e.g. mechanise, provide means of doing maintenance or cleaning outside of hazardous areas.

The full text of this part provides an excellent source for a checklist for designers. If any hazards remain after applying these principles wherever possible, we must resort to the design of appropriate guarding systems. A lot of this was covered quite well in the old standard, but there is now much more emphasis on the design of safety related control systems.

Safety related Parts of Control Systems

The emphasis on safety related parts of control systems is at the core of the new standard, and has the potential to raise the standard of these systems. The design of control systems is outside the scope of most ergonomists, but they have an important part to play in the risk assessment process which leads to the choice of the control system category. They should also have a general understanding of the principles, so that they can work with designers on developing an appropriate solution. Figure 1 is a simplified representation of a basic control system for a three phase electric motor which might be driving a production machine. The machine is fitted with a guard which has an interlock switch designed to stop the machine if the guard is open while a hazard to the operator exists. This switch is part of the control circuit which is usually at a lower voltage than the power circuit to the motor. The emergency stop switch and any safety relay form other safety related components of the control circuit.

The power circuit includes an isolating switch, and this may be fitted with a lock-out device for maintenance purposes. Sophisticated lock-out devices are available. Typically, a key is required to open a guard door to gain access, and this key is locked in place at the isolating switch until the isolating switch is opened. The isolating switch then cannot be closed until the key is replaced, and the key is locked in the guard door until it is closed. There are many possible variations of such trapped key systems, including opening guard doors only after some delay, opening multiple doors in sequence and issuing multiple keys where several workers need access.
Turning back to the control circuit in Figure 1, opening of the guard, or operation of the emergency stop, de-energise the relay K1 thus opening the motor contacts M1(stopping the machine), and the latching contact C1.

Category B: A basic system such as in Figure 1, constructed in accordance with relevant standards. A single fault could lead to the loss of the safety function.

Category 1: Requirements of B plus well-tried safety components and principles, including the use of positive mode switches. A single fault could lead to the loss of the safety function, but is less likely.

Category 2: Requirements of 1, plus safety functions to be checked at start-up and at suitable intervals by the control system or manually. If a fault is shown, an output will initiate a safe state (preferable) or give a warning signal.

Category 3: Requirements of 1, plus the control system must prevent a single fault from leading to the loss of the safety function, and where practicable provide an indication of the fault. This may be achieved by the use of redundant devices.

Category 4: Requirements of 3, plus the control system must indicate the fault at or before the next demand on the safety function. An accumulation of faults must not lead to a loss of the safety function.

Positive mode switches are mentioned in Category 1. For an interlock switch to operate in a positive mode, the opening of the guard must apply direct force on it to open it and thus interrupt the control circuit which switches power to the machine. If the opening of the guard only releases force on the switch, relying on spring force in the switch to open it, the switch would be prone to failure through the following possibilities.

- The switch contacts could become welded closed.
- The spring for opening the switch could break or jam
- The switch could be deliberately held or wedged in the closed position.

Any of these possibilities would leave the machine running, i.e. the system would have failed to danger. There are numerous commercially available types of positive mode switch, to suit different applications.

Categories 2, 3 and 4 require the introduction of a safety relay into the control circuit. The safety relay monitors the safety interlocks and emergency stop functions to ensure that they are operable at every cycle. This ensures, for example, that any attempt to disable an interlock, or any damage to its mounting, is detected before it can cause a loss of the safety function. Categories 3 and 4 also require dual contacts in interlock and emergency stop switches, and in the relays.

Figure 1  Basic control and power circuits (based on a diagram in Pilz Automation Technology, 1999)
Risk Assessment

General principles of risk assessment are well known, but the standard (Part 1301) gives a useful coverage of principles related to machinery, including an extensive list of possible hazards. Part 1501 Design of safety-related parts of control systems includes a risk assessment matrix for the purpose of helping select the appropriate category of control system. This selection method is “informative”, i.e. it is not mandatory. The matrix is shown in Figure 2.

A task analysis (as done by ergonomists) can contribute to determination of the appropriate category of control system. Tasks in all uses of the machine concerned must be considered, including installation, operation, cleaning and maintenance. This is in line with the Australian National Standard for Plant and its state equivalents.

![Figure 2. Matrix for selection of safety-related control system (EN 954)](image)

Where:
- S: Severity of Injury
  - S1, Slight (normally reversible) injury
  - S2, Serious (normally irreversible) injury including death
- F: Frequency and/or exposure time to the hazard
  - F1, Seldom to quite often and/or short exposure time
  - F2, Frequent to continuous and/or long exposure time
- P: Possibility of avoiding the hazard
  - P1, Possible under specific conditions
  - P2, Scarcely possible

A lower category than indicated by the matrix might be acceptable if certain possible faults can be excluded, e.g. if the wiring is robust and of good quality, it may be reasonable to exclude the possibility of an earth fault or a short circuit in the wiring. However, it might be deemed a better strategy to err on the safe side and not exclude any possible faults.
Other Parts of the Standard Concerning Ergonomics

These parts are briefly described as follows, using abbreviated titles.

Part 1401 Ergonomic principles - Terminology and general principles. The emphasis in this part is on task analysis, which is rightly shown to be the starting point for design, and is a vital part of the work of every ergonomist.

Part 1901 General principles for human interaction with displays and control actuators. In this part it is pleasing to note the following quotation:

“Knowledge of ergonomic principles is the basis for a successful implementation of a human-machine system. In particular, it is important to ensure that systems are designed as an iterative process between the designer and the users.”

Apart from a good list of principles, this part includes an informative appendix on human information processing which covers the main points.

Part 1902 Displays. This part departs from the performance basis, providing some basic guidance on analog display design. Auditory and tactile displays are also covered briefly.

Part 1903 Control actuators. Ergonomists may not find this part so useful. It consists mainly of a “systematic procedure that will enable designers and manufacturers to select manual control actuators meeting their specific requirements”. It does stress the need for task analysis, and lists task requirements that might need to be met. However, its tabular procedure for selection of a specific type of control is confusing, and could result in a control which does not fit in with the rest of the workstation, or is not commercially available. A thorough coverage of guiding principles would lead to a better result.

Part 1904 Requirements for visual, auditory and tactile signals. This part covers the best ways to present warning signs and signals, including placement in the field of vision, lighting and colour for signs, and sound levels and sound patterns for signals.

Part 1905 Requirements for marking. Features of machinery which need to be marked for the information of the operator, including name plates, safe conditions of use and some standard graphical symbols are covered.

Part 1906 Requirements for the location and operation of actuators. This is all a part of the design of control actuators, and would have been better included in Part 1903.

Part 1907 System of auditory and visual danger and information signals. This gives recommended standards for these signals, and could have been combined with Part 1904.

To summarise, the parts of the standard dealing with ergonomics are fairly comprehensive, giving designers a listing of topic areas which they need to consider. Ergonomists will not find much which is new to them, and may prefer their own methods of working to achieve the same performance requirements.

Discussion

The new standard should be welcomed by ergonomists because of the emphasis it places on ergonomics in design. Some of the anthropometric data must be treated with caution, but it gives starting points for some aspects of design, and indicates which dimensions may be critical for safety. The format of the standard allows parts to be replaced when the equivalent European or ISO standards are revised, so designers can keep up with world standards. Unfortunately, this has led to a rather unwieldy collection of parts and some repetition between parts.

The emphasis on safety related control systems raises the standard required of these systems. The complexity involved may indicate the need to call in experts such as suppliers of the control system components. There are several suppliers to choose from, so competition should keep costs down to a reasonable level.

The question must be asked about how compliance with the new standard may be achieved. A lot of industry in Australia is not in compliance with old standards. Perhaps this is an opportunity for the inspectorate to encourage management to raise its standards of machine safety.

References


Thompson, D., 1989, Reach distance and safety standards. Ergonomics, 32(9), 1061-1076
Talking Point 2

[Ed: It was a delight to receive—almost timed as a Stop Press— an email forwarded by Paul Hutchinson, a contributor to Talking Point, which came in response to his article Public Transport Timetables: Design for Passengers. May there be more such evidence of the distribution of our journal across the globe. Thanks for sharing this Paul.]

Timetables: a letter for your editor

I think any serious discussion of timetable provision is a notable feat. In Britain we are facing the thought that for the first time since the mid 19th century obtaining a simple overview of our rail network’s service will become very difficult with the abandonment of the printed Network Rail All Lines timetable in 2007.

Only around a decade ago and British printed timetable provision looked very different and one major initiative called the Great Britain Bus Timetable was being trumpeted as an effective product of the computer age. New technology was making the setting up of printed publicity much cheaper. Now there is to be neither an all railway nor an all bus timetable in our country.

Network Rail has decided that the provision of information via its Journey Planner on the internet is a better bet than raw data provided through the timetable pages (one will be still be able to download them as PDF files, what a prospect).

One of the biggest challenges of the timetable genus is the intellectual engagement it requires. This has many parallels to the Bible. Interpreting the document is not always self evident yet the idea of restricting access to the Bible or providing edited highlights would undoubtedly upset. Many people conventionally value their ability to make their own choices.

That’s all very well if you are backpacking around a country or planning a complicated business itinerary. For the daily commute matters may look different. What may be more critical than pieces of paper is accurate on-line or real time running information where technology has a great role to play.

For my money what should drive timetable provision at a local level are simple considerations of clarity, good quality visual representation like mapping. I also believe that users do appreciate continuity. Brand loyalty is an important consideration. Urban services near where I live are in part provided by a concern dating back to 1913. That has proved very adept at re-inventing itself. Currently it is engaged in a major re-branding exercise which makes over local routes giving them strong local identities but manages to do this whilst retaining clear information and presenting on the covers of its literature strong imagery. Imagery that translates into saying: this is our job, we do it well, have done for a long time, come and join us (the Go Ahead North East rebranding project in North East England since Summer 2006).

Often for established services, the user brings a great deal of pre-existing knowledge. They are responding to what they already know. When a totally new initiative is being launched different provisos will apply. Beyond producing information, a critical factor often overlooked is distribution. You can have the most theoretically perfect timetable leaflet but if it does not reach potential customers it is all wasted. Leaving timetable leaflets in boxes or even in bus station enquiry offices (preaching to the converted) are a sin. The good old door to door distributor comes into his/her own. Britain’s Arriva bus company produces timetables specially intended for door to door distribution and not otherwise available. That is targeted selling taken right through to a determined conclusion.

It may seem strange but timetable publishers have sometimes not been afraid to stimulate political debate. The previously mentioned Great Britain Bus Timetable was a stunning example with a long series of highly original cartoon like covers covering a wealth of sensitive issues in transport politics. Even the “establishment” based British Railways timetable managed in its final days to deploy the political cover with its empty parallel lines disappearing into bleak watery sun covers.

As T.P. Hutchinson has intimated, the timetable compiler and publisher should not be a blushing lily. The conflicting demands of presenting such information should possibly be seen just as much as an art as a science.

This writer is concluding a study of The British Railways Timetable 1948-97, the first time any such volume has been written. Some of what one discovers is unexpected. The British Railway corporate image project of the mid 1960s is rightly regarded as a landmark in transport. But when applied in the field it has been instructive to see how different two simple timetable cards could become even when constructed from the same elements. Simple issues like use of type weighting and colour choice could provide a very different result in terms of legibility.
Every timetable compiler should take comfort from this: *I would sooner read a timetable or a catalogue than nothing at all. They are much more entertaining than half the novels that are written.* (W. Somerset Maugham).

The Summing Up. Yes, entertainment, sometimes unintentional but at other times deeply creative. A timetable can engage the imagination with its promise of the joys of travel to be undertaken.

Robert Forsythe’s website at www.forsythe.demon.co.uk is an entry point to the three existing studies of transport literature that he has had published by Tempus, to the many periodical pieces detailed in his bibliography and to the present project *Are we on time: A History of British Railways Timetables 1948-1997.* He also stocks a wide and international assortment of obsolete timetables which are mainly vended via e-bay or www.specialistauctions.com.

Yours sincerely
Robert N Forsythe
www.forsythe.demon.co.uk

---

**Talking Point 3**

**In Conversation**

**Jeffrey Frith** (Bach Arch. Melb.), CPE.

A professor at a University in Texas wanted to know if I would participate in a teleconference discussion with his class of final year Architecture students. He had set them a topic to research: *what career opportunities exist for graduate architects outside the normal design and construction industries.* One of the students found my name on the web and thought an architect practicing as an ergonomist sounded interesting.

I duly participated in the teleconference and was fascinated by some of the questions.

*Student*

Do you consider yourself a rogue architect?

**JF** No way. I consider that it would benefit all if architects had a working understanding of ergonomics. Ergonomics deals with people, places, spaces and products. Ergonomics puts people first. It aims to optimize people’s physical and mental capacities at work. Architects not only need technical skills they need people skills too. They need to understand what it is that people need. To achieve a satisfactory outcome architects have to develop effective ways of communicating with their clients, to involve their clients in a meaningful way in the briefing process, to address legitimate concerns that the clients may have at all stages of the project and to find out what the clients think of the completed facility after they have lived and worked in it for awhile.

*Student*

In what way has ergonomics changed your professional practice?

**JF** I consider myself to be a human-centered designer. Ergonomics draws on a number of disciplines including physiology, bio-mechanics and psychology. Understanding how people develop physically, how people move and how they process information provides a designer with essential information. Much of my professional career has been spent working for Commonwealth Government departments, on innovative projects of national significance.

This has entailed establishing standards and guidelines for designers fitting out workplaces in factories and offices. Some of the standards I have worked on concerned issues such as Access for people with a disability, Safe use of screen-based equipment, Signage and Workstation furniture. I work with architects and project managers on a daily basis, providing specialist...
ergonomics advice at all stages of a project. I also work for clients directly and play the role of advocate, ensuring their needs are effectively communicated to their technical advisors. At a more personal level I also consult on a one-to-one basis with individual clients who are concerned to improve their work postures and work practices.

Student
What has had the greatest impact on the work environment in offices?

JF No doubt about it, the introduction of computer based technology has had a huge impact on the way we work, the tools and the spaces we use. While buildings have a life cycle that may see them written off in 60 years, the fit-out of the interior in 15-20 years, workstations and associated furniture is often replaced in a matter of 5-7 years. Why? Because advances in computer technology have been so rapid that the built environment becomes obsolete.

As office workers become more sedentary more design effort is required to provide work environments, furniture and equipment that adjusts to individual needs. Providing good seeing conditions, good thermal comfort and a good acoustic environment is not a matter of meeting minimum standards. Rather, it is a matter of providing optimum conditions where people can work safely and remain healthy and productive at work.

Student
Do you have any advice for architecture students looking for careers outside normal architectural practice?

JF Yes. Use what you have learnt, your skills of problem solving, data gathering, and synthesis thinking to benefit people. Architecture provides a rounded education with a balance of science subjects and the humanities Use your creative talents to develop innovative solutions to perceived problems. Realise that the solution to a client’s need may not be a new facility or product but a thoughtful recycling or redesigning of what already exists.
Macro and micro ergonomics in relation to NSW Police workplace stress disorders.

Neil L Adams and Neil D Adams

ABSTRACT

This paper is a condensed version of the material presented at the HFESA 2006 Annual Conference. It offers an overview of the macro stressors (organizational factors) and the micro stressors (actual job circumstances and task demands—particularly the psychological aspects of the task demands and their sequelae) that are likely to impose injurious stress on police officers. The paper discusses the major occupational and organisational stressors encountered by officers working in a variety of specialist fields, from undercover operatives to child protection officers. It considers the interactions between the individual psyches or personalities of the officers and the demand characteristics of the various circumstances and work situations in which those stressors are likely to exist. The essential point of the paper is that the demand characteristics in any task situation are a function of the interaction between macro and micro factors. These demand characteristics directly affect unsafe or stressed behaviour and possibly deeper seated stress reactions. Alternatively, appropriate ergonomics and organisational performance at the macro level should result in good ergonomics (physically, socially and environmentally) and hence safer and less stressful behaviour at the micro level.

INTRODUCTION

The data on which this paper is based were derived from intensive interviews and studies of case material, including many voluminous psychiatric reports, over the last ten years. They relate to upwards of fifty retired police officers whose exposure to stress occurred from as early as 1980 to as recently as 2005. Conditions conducive to stress and the organization’s responses and preventative/ameliorative actions may have changed since the time of the data collection.

For the purposes of this paper, the following (possibly idiosyncratic) definitions have been adopted:

Micro-ergonomics comprises the entire complex of the immediate situational factors—tools and equipment, physical and social environment, taken in conjunction with the capacities and limitations of the exposed individual—that combine (or conspire) to integrate into what is referred to in this paper as the demand characteristics of that particular situation. In the micro ergonomic context, it is this complex set of demand characteristics that evoke the individual’s behaviour, including their internal responses.

Macro-ergonomics incorporates all of the antecedent organizational and contextual factors—the decisions, incidents, constraints and earlier behaviours—that have been conducive to the development of any specific situation and its micro-ergonomics features. In this view, the attitudes, perceptions and motivations, as well as the ingrained behavioural predilections and skills of the individual in the micro-ergonomics context, will affect the success of the behaviour produced in that situation.

A stressor is any situation or circumstance which engenders stress (although not necessarily experienced consciously) in the person exposed to that situation or circumstance.

Stress is both the experience and the condition associated with a person’s inability (or perceived inability) to cope effectively with the demands imposed by the exposure to a single intense stressor or an accumulation of stressors. This can be an accumulation in a given situation, or an accumulation over time, with the sequence of exposures having a cumulative effect.

The author uses a model developed by Janis (1958) when considering the relationships between potential stressors, individual stress responses and possible consequences of exposure to cumulative stress. For many people the normal day-to-day stresses—aroused by meeting demands or handling minor family or work frustrations—are dealt with more or less automatically. Because the demands do not exceed their capacity or their skills, the total stress for these people does not accumulate to a level where it crosses their own personal tolerance limit or threshold. Therefore it never really intrudes on their comfortable handling of the day’s pressures and needs. This first, or comfort level threshold is referred to by some writers as threshold A. However, even the automatic coping with low level stress, if the stress is continuous or chronic, can lead to a certain amount of tension and fatigue, and can actually reduce one’s ability to cope with further stress. That is, chronic stress even below threshold A can cause a lowering of that threshold and increase one’s susceptibility to additional stressors.
Frequent exposure to stressors which raise the stress level above Threshold A may not diminish the ability to cope at a more highly aroused level, but a concomitant effect is a demand for greater effort and thus the psychological cost is greater. Consequently, if one is coping with chronic stress above one’s Threshold A level, one may develop psychosomatic symptoms (those disorders which have clear physical symptoms, like headache, backache or gastrointestinal disorders). Moreover, the next threshold, the Threshold B or Breakdown threshold is likely to be lowered, so that again the susceptibility to stress is increased and the negative effects of stress are likely to be aggravated. Even slight additions to the stress level may then result in it passing the B threshold.

In extreme situations, a person whose stress levels chronically exceed their B threshold may sink into apathy or learned helplessness. They may become depressed or may actually suffer a neurosis. There is not necessarily a one-to-one correspondence between the intensity of stressors in a given work situation and the stress experienced by those exposed to it.

MICRO-ERGONOMICS OF POLICE STRESS EXPOSURE

Described below in extremely summary form are several typical stressful exposures of the kind recounted by police officers serving in a variety of specialist areas. In almost every instance, the officer retained vivid images and recollections of the incident, encounter or set of immediate circumstances, and suffered chronic stress effects such as flashbacks, recurrent nightmares or feelings of dread or heightened anxiety in situations with some similarity to the original. It is important to realise that not one of the single events that are described should be regarded as the sole cause of the respective officer’s eventual stress disorder. Each of the following is included as an example of micro-ergonomics since in every case any anxiety or stress that was aroused or experienced can be attributed directly to the immediate environmental stimuli and task/situational requirements; and to the immediate external and internal demands deriving directly from those requirements.

A child protection officer

In only her second year of service and as a young woman of 20, this officer had repeatedly to deal with abused and traumatised infants and the perpetrators of the assaults against them. With no specific training in this kind of work, and without any significant peer support this young woman became increasingly sensitive to the physically and psychologically injured children and infants with whom she had to deal. Her interaction with the children included, in many cases, the dependencies on her that children can rapidly develop. The dependency would be abruptly and frustratingly terminated as a child was taken over by another agency. Another frustration and source of stress in this area of work was the disturbing frequency with which cases might have to be dropped because of the lack of hard evidence, despite the officer’s firm belief that the child had been or was being actively abused or molested.

A traffic officer

To deal with any road accident that results in death or traumatic injury is always stressful, but when the officer encountered a severely mutilated young child of the same sex and age as one of his own children the stressor acquired personal relevance and poignancy.

A crime scene investigator

To engage intimately with the consequences of a shooting, a stabbing, or a suicide, and to have close physical contact with the recently deceased and possibly blood spattered items of clothing and/or furniture and furnishings, is not simply distasteful but is distressing. This is particularly the case if the deceased was known to the officer, as was the case for an officer stationed in a country town.

An accident rescue specialist officer

Like the traffic officer, a police officer performing this work would face many situations where severely injured and maimed persons need to be assisted. Most harrowing was an account of one situation in which it was impossible to perform a quick rescue and the injured person, a person well known to the officer, slowly died as the rescue effort continued.

Undercover officers

Undercover work has many micro-ergonomics situations that can be cumulative stressors, some of which are virtually chronic in that they may extend for weeks or even months. These include:

- experiencing the cognitive dissonance induced by veridically living a criminal or drug-taking lifestyle that is completely contradictory to an upright police officer’s real and preferred lifestyle;
- winning the trust and pseudo friendship of persons who must ultimately be betrayed;
- working face to face with criminals known to be armed and dangerous—and being at risk of physical harm if one’s cover is blown; and
A writing platform for keyboards

Enables easy access to the keyboard while working with papers or books.

Your papers are directly in front of you. You won’t have to twist your body to write to the side of the keyboard and you won’t have to reach over your papers to get to your keyboard. The MicroDesk®’s writing surface has an adjustable slope to improve your work posture and prevent slumping.

FEATURES

- Utilises your desk space with an elevated, adjustable working surface.
- Strong construction allows you to rest your writing arm on the surface safely while maximizing your desk space.
- Height and slope adjustment to fit both standard and ergonomic keyboards.
- Suitable for both left and right handed users.
- Easily lifted and stored when not in use.

MODELS

- Regular MicroDesk®. For standard single-surface desks
- Step MicroDesk®. For use on keyboard tray or split level desks.
- Mini MicroDesk®. Surface 410mm wide x 310mm deep (16”W x 12”D)

Q/Land, NSW, ACT and Vic
OPC Ergonomics
Mob: 0411 888 187  Fax: 02 954 22704
Email: allenfieldn@primusonline.com.au

SA, NT, Tas and WA
Back Centre and Specialty Seating
Tel: 08 8351 0666  Fax: 08 8351 0707
Email: specialty.seating@backcentre.com.au
remaining alert and aware while having to partake of amounts of alcohol or other drugs that could seriously diminish the capacity to maintain the undercover persona and avoid some accidental disclosure.

**General duties officers**

Even in general duties, a police officer may face situations of the same type as some of those outlined above, as well as having to remain in a monitoring or guarding role in distressing circumstances. For example, one G.D. officer was required to maintain guard over the hanging body of a teenage suicide while waiting for a forensic team to make its investigation. The officer was particularly distressed by two aspects of the situation:

- he had had previous dealings with the young suicide, and felt in some ways responsible for the ‘solution’ that the youngster had sought; and
- the location where the body was hanging from a tree was beside a road along which the officer knew the school bus, full of compatriots of the deceased, would soon be passing.

Another GD officer was given the task of scouting along a railway line to find and collect the body parts of a person who had been decapitated and dismembered by being run over by a train when she committed suicide by jumping in front of it. Adding to the stress experienced by that officer in that situation was the apparent jocular callousness of his sergeant in dealing with the remains of the deceased.

**Special task force or crime squad officers**

An officer opened his front door to find a known felon wielding a shot gun. While this may be regarded as a possible situation to be confronted in the line of duty, it must entail heightened anxiety and stress. Any interaction with armed and dangerous known criminals such as occurred at the infamous Milperra Pub Bikies’ massacre, particularly when shots are fired and one’s self—or if one’s fellow officer—suffers injury, would generate stress.

**Senior line officers at regional level**

Specific micro-ergonomics situations consistent with the definition given in the Introduction are less easy to identify in relation to senior line officers who have been interviewed. Nevertheless, it is reasonable to include such situations as:

- vicarious involvement in junior officers’ distress in any of the categories discussed above as they reveal the effects of their own direct involvement to their senior officer; and
- immediate reactions to an organisational directive that requires significant cuts in an already overextended staffing allocation.

In some regions, it is a responsibility of the duty officer to attend every major traumatic incident. Also, of course, every line officer will have had years of earlier exposure to stressors of the type outlined above, and may come into the management position already carrying accumulated stress.

**MACRO-ERGONOMICS OF STRESS EXPOSURE**

Some aspects of the organisational ethos and pervasive attitudes within the service very definitely influence the way in which the stress exposure of individual officers may be experienced and handled. A brief summary of the more common macro-ergonomics—or organisational sources—of stress would include those described below.

**Inadequacy of training**

Not one of the officers interviewed expressed any satisfaction with the way in which stress—its potential causes, ways of responding or dealing with it ... including access to organisational facilities—had been dealt with in either their basic training or any subsequent specialist training. Quite the converse: most were quite critical of their unpreparedness, via their training, either to identify within themselves the symptoms of stress or to utilise effective stress management or stress minimisation strategies.

**Organisational ethos and attitudes of fellow officers and of superiors**

There is a common expectation that the police officer will strongly withstand any assaults on the strength and integrity of his/her personality, and will deal calmly and stoically with any threat or source of anxiety that might faze an ordinary citizen. In fact, police officers themselves have this identical expectation. Unless they are appropriately trained and forewarned, they are likely to interpret any increasing susceptibility to stress (resulting from the cumulative effects of multiple exposures) as an indication of weakness in themselves. (See the Task Force Alpha Report, cited below). Although there is provision for referral to the Psychology Branch for support and counselling if this is deemed necessary, it has been (at least until the early 2000s, and may still be) regarded as a career death knell to seek or to be referred to that service. It was always regarded as an indication that the officer did not have the strength of character or the strength of will to handle the stressors which every officer might expect to meet.
Lack of suitable support from fellow officers for specialist workers

There are many examples of officers already dealing with extremely stressful and demanding specialisations being undermined psychologically (presumably without malicious intent) by the attitudes and actions of their fellow officers. Two examples illustrate this.

1. Several workers in child protection units in quite different stations felt that their very harrowing work was belittled by their fellows referring dismissively to their group as the nappy squad. The belittling went deeper than mere derogatory naming. They were made to feel that because, quite commonly, the perpetrators were as easily identified and contacted as their victims, there was no real police work or detective work involved.

2. Undercover workers involved in close associations with drug traffickers and drug users were not uncommonly as derided by their fellow officers as were the criminals with whom they had to blend. Little, if any, effort was made by officers to help the undercover worker recover or reinforce his/her basic police identity, as opposed to the undercover persona that had to be adopted for so much of the working time. In fact, one officer was almost universally spoken to and referred to by fellow officers as Harry—the undercover name and character, which was nothing like the officer's actual name and character—even when in the station and in normal police attire. [NB: Not the real pseudonym used]. This thoughtless practice could not but reinforce the cognitive dissonance referred to above.

Irregularity of shifts and systems of work

Admittedly it is an unavoidable aspect of much policing work that the officer will be on call, particularly during normal hours of duty but also, in many specialist areas, at any time that an emergency or an urgent demand for a specialist service is required. Not only must the officer be prepared to attend a call out at any time of day or night, but there is also the constant nagging awareness that the call out might be to an extremely stressful situation. Consequently, there is not only the unpredictability of demand, but the ever-present possibility that the demand will include major trauma or threat and hence exposure to major stressors. This negative anticipation (anxiety? trepidation?) can be evoked every time the 'phone rings, increasing cumulatively as the stress mounts over years of such experiences.

Poor organisational communication

Most officers who were interviewed were derisive of the quality of communication within the organisation. Even fairly senior officers felt that they had little or no influence on decisions affecting the management of their own stations or regions. Most were unaware of such publications as the Instruction 12 – Police Psychology Section, cited below, or similar informative documents. Officers referred to the lack of time available to pursue that kind of information and the lack of emphasis placed on it by the system or specifically by officers senior to them.

Physical comfort and safety

The furnishings and fittings of many work stations within police stations have, from an ergonomics perspective, left much to be desired. It is unnecessary for this aspect of macro-ergonomics (the provision of ergonomically suitable work stations) to be discussed in this paper. One has only to walk into one's local police station to see examples of poor placement of computer screens, keyboards, desks and chairs. It is more probable that when out of the station an officer might encounter threats to safety.

Quite obviously, a police officer could be expected to enter situations where the officer's own safety would be at risk. Again, while it must be acknowledged that this could be regarded as part and parcel with the job of a police officer, there have been situations where the organisational provisions were quite inadequate. Hence the macro-ergonomics contributed significantly to the stressor value of an officer's involvement. For example, an undercover officer was required to wear a transmitter into a meeting with drug traffickers so that he could advise fellow officers (waiting nearby) about when an exchange would take place and a bust would be successful. However, the equipment was either not adequately maintained or was unsuitable for that task ab initio. In that micro-ergonomics situation the undercover officer was left unsupported and without external contact as the denouement was reached. He was at very real risk of being shot or savagely attacked. It was fortuitous that the officers waiting outside realised that communication had failed and made a suitable and literally arresting entry in the nick of time.
SOME COMMON CONSEQUENCES OF REPEATED EXPOSURE TO STRESSORS OF THE TYPE DESCRIBED ABOVE

This section must be very brief: The most common diagnoses (made by psychiatrists or counselling psychologists, not by the author of this paper), or behavioural consequences leading to the officer being retired as *Hurt on Duty* are noted below.

- **Post Traumatic Stress Disorder**—this diagnosis by plaintiff’s psychiatrists, although increasingly common, is sometimes criticised by defence psychiatrists on the grounds that, strictly speaking, a PTSD should be attributable to a single traumatic exposure, and not to cumulative exposure. In fact, some even go so far as to claim that stress is not cumulative and that repeated exposures should build up a resistance or a strength that reduces the likelihood of the officer succumbing to the effects of stress.

- **Depression**—in any or all of its manifestations.

- **Any of a variety of disturbed psychological states**—that may be accompanied by depression or are indicative of PTSD without being so consistent as to warrant a clear PTSD diagnosis. The author’s reports and this paper are based on the acceptance that, regardless of the particular labels used in the diagnosis, the individual officers have succumbed in one way or another to the repeated exposure to occupational and organisational stressors to the extent that they have developed a debilitating and more-or-less chronic psychological disorder, sufficiently intense to preclude their being able to function effectively as police officers. Whether any of these officers is capable of recovery to full psychological health and well being is a question left to those who are involved in their ongoing counselling and treatment.

- **Deterioration in performance in all aspects of life**—work, family and social. The officer may or may not be consciously aware of this deterioration. It is not uncommon for there to be an increased use of alcohol. This can be both a symptom of the officer’s deteriorated psychological condition and a cause of further deterioration in performance. It may also exacerbate the officer’s already compromised ability to handle accumulated stress. Without access to formal statistics reflecting the breakdown of marital or partnership relationships, the author can state that in a majority of the cases with which he was personally involved there was an irreconcilable separation, (majority meaning quite substantially more than 50% and certainly higher than the population average figure for divorce).

- **An actual nervous breakdown of some kind** (using the term in the commonly recognised sense). Some examples:
  - bursting into tears in the station when faced with a demand to attend a call out;
  - responding with disproportionate, virtually uncontrolled anger, (physically expressed) to a routine order or request;
  - finding it simply impossible to drive into work one day;
  - being so distressed at the prospect of passing a location where a traumatic accident had been attended some considerable time in the past that the officer had to turn around and go home;
  - becoming suddenly paranoid about the safety of his own children; and
  - committing suicide—the ultimate expression of despair at the inability to cope.

SOME BACKGROUND INFORMATION

This section of the paper, instead of providing abstracts or summaries from a number of major publications, consists of an annotated bibliography of reports and publications, listed in chronological rather than alphabetical order, that all focus on the exposure of police officers to stress, and ways in which that exposure or its potentially damaging consequences may be obviated or at least ameliorated.


Not Australian, obviously, but this symposium having been held in 1975 the publications deriving from it ought to have reached the attention of the NSW Service, one would expect, by at least the 1980s.

Also not Australian, but this comprehensive set of training films was available so early (1975), that it is reasonable to expect that some of the higher placed personnel in the Police Service ought to have been aware of and even made use of them.


This significant book is included since reference was made to it in the Seedsman appeal judgment by Spigelman CJ., et al in 2000 (q.v.) and might have, even at that late stage, prompted greater attention being given in the Service to stress management in all respects.

O’Connell, Sgt., 1982 or ’83, Voluntary course for police on methods of coping with occupational stress, Wagga Wagga, also cited in the 2000 Court of Appeals judgment by Spigelman et al (q.v.).

It is clear from the comments in the Spigelman judgment that senior police were made fully aware of the information gathered by O’Connell. (See p.31 of the judgment).


Mary Manolias’ recommendations based on the workshop described in this report, although with reference to the U.K. Service and experience, are in the main very directly applicable to the NSW Service, as it was in the early ’80s and appears largely to have remained through the 1990s and early 2000s.

Leonard, G. (Tasmanian Police Service), September 1987, Occupational Stress – Stress and the Undercover Police Officer – a Discussion Paper, prepared for the National Police Research Unit. Like several of the other papers or reports in this list, this paper by Leonard had applicability to a much wider range of specialty and general duties roles than its rather specific title would suggest. His recommendations for pre- and post- stress exposure are valid for most stressful situations.


Reference to this syllabus is included since it contained two segments dealing specifically with stress. The presence of such items in the programme as early as 1988 reflects an awareness within the Service of stress as a significant problem.

Police Instructions: A series of documents, ranging up to 20 pages and dealing with Welfare, Counselling, Health and Safety and similar issues was released, with dates from October 1979 to April 1992.

These include:


Instruction 10: Police Injured on Duty (November 1991) and Police Medical Services and Medical advice on Police Matters (undated) and Facilities for Police at Prince Henry Hospital (undated, but apparently preceding Instruction 11).

Instruction 11: Medical Services available to Police at Prince Henry Hospital (November 1991) and Occupational Health and Safety (undated).


It is apparent that all of these instructions were well intentioned and they do reflect laudable principles and policies. The fact that the majority of officers interviewed had no knowledge of these instructions or their content suggests that there are—and have been for some time—significant deficiencies in the systems for effective organisational communication and the dissemination— or acceptance of—information that emanates from top management.


This paper was prepared, according to its Mission Statement, to ensure that The New South Wales Police Psychology Unit and Peer Support Officers will operate as a team to lessen the impact of critical incidents on staff members or their immediate families. (Page 5 of the document) As with other papers with an apparently specific target, this paper contained much that had quite general relevance.

Although the title of this task force reported suggested it would focus on Physical Risks, two quite long chapters dealt solely with stress. Chapter 3 of this report was devoted to Organisational Management of Stress and there was a considerable section of the report dealing specifically with Post-Traumatic Stress Disorder.


Michelle Fisher made recommendations that were obviously available to the defendant as early as 1993. Her recommendation 7 was as applicable to most other specialist and general duties areas as to Child Mistreatment. Fisher recommended: Systems of support are needed ... It is recommended that informal staff get together, peer support groups and debriefs (after difficult situations) be instituted to provide this support.


This report provided part of the basis for the Submission to the Royal Commission into the NSW Police Service: Future Directions in the Delivery of Child Protection Services, submitted by the NSW Police Service, August 1996.


Although ostensibly directed towards Forensic Services, recommendations and other comments made by Blood had applicability to the service in general.


Although this was a graduate student exercise, its results and recommendations were clearly available to the EAB of the Service, and hence, one might reasonably assume, to the Service as a whole.

Goldring, DCJ., October, 1997, District Court of NSW; Finding in the Matter of Seedsman, B.L., a female Police Officer who had made a common law claim on the basis of having suffered a Post Traumatic Stress Disorder.

Although the Judge’s finding in favour of the plaintiff was appealed, and not settled until 2000 (again for the plaintiff) the original finding ought to have put the Service well on notice that Stress was becoming a financially as well as personally significant problem.


This report made a number of eminently sensible recommendations about management procedures and strategies for the amelioration of stress as an organisational, as well as individual, problem. There is little evidence that Garbutt’s suggestions were implemented.


This report made some very cogent recommendations about the Service taking ... immediate steps to ensure that Critical Incident Stress Debriefing Teams are always used following critical incidents. ... It also made reference to the recommendations in the Garbutt report about appropriate management action and procedures that could (should) be implemented.

Corboy, Michael, June 2000, Coping with Trauma, Police News.

This article was based on a survey conducted by Corboy in 1997-98, involving some 300 personnel within the service, including quite senior officers. Corboy’s results show that even in the late 90s over 90% of officers who experienced stress did not seek any assistance. This finding supports the author’s contention that the entire organisational ethos needs reorientation.

Spigelman, C.J., Mason, P. ands Meagher, JA, August, 2000; Court of Appeals Judgment in the matter of Seedsman.

This judgment dismissed the appeal and supported the decision for the plaintiff, made in 1997 by Goldring DCJ, noted above. Detailed reference was made to some of the other sources cited in this list.
STRATEGIES FOR PREVENTATIVE OR AMELIORATIVE ACTION

In a very real sense, even those strategies that may influence the micro-ergonomics of tasks or situations that are stress-inducing would have to be seen as deriving from the macro-ergonomics of policing work and service. These strategies entail activities like planning and providing effective training as well as the provision of back-up services and equipment. One example of this was illustrated by the undercover officer whose stress was significantly increased by the failure of his communication equipment. The strategies suggested here are based on the various proposals advanced in such sources as the Task Force Alpha Report, the Manolias Report and the Sgt Leonard document cited earlier in this paper, as well as Dr Neil Adams’ active involvement as a psychological counsellor and as an organisational consultant over the past forty years.

Micro-ergonomics strategies

Micro-ergonomics strategies refer to those demand-response patterns that either obviate the arousal of stress to a level that could be potentially damaging, or that enable the officer to recognise and cope with the stress arousal in ways that minimise its cumulative or longer term effects. An officer who has been adequately prepared through training, including suitable experiential exercises, ought to be better able to utilise stress avoidance or stress alleviation techniques, if not while actually confronting the stressor(s) in the micro situation, then immediately after withdrawal or release from that situation. The possibilities would include:

- intensive and very realistic role play activities;
- simulated or protected exposure to similar distasteful, threatening or traumatic confrontations;
- ‘inoculation’ of the officer with respect the stress that such exposures would be expected to arouse in a less well prepared person;

For example, carefully graduated involvement in post mortems, with empathic support during the earlier exposures, would better equip an officer to deal with dead or seriously maimed persons than would a sudden first-time exposure to a traumatic accident involving death of one or more persons. This kind of inoculation or desensitisation is not necessarily to develop callousness, but is necessary to develop resilience. Most importantly, it should be aimed at developing an acceptance that one’s revulsion, rejection, and/or urge to disengage are all natural responses. Those natural responses will be less stress engendering if they are recognised as entirely valid and are accepted as appropriate to the situation, rather than being feared as indications of some weakness that must be suppressed and, above all, hidden from one’s fellow officers.

- more comprehensive and pertinent pre-exposure preparation;

Although this obviously harks back to macro-ergonomic factors, emphasis with respect to the micro-ergonomics or the immediate exposure situation can be placed on the two relevant aspects:

a) the physical preparation; and

b) the organisational/psychological/situational (OPS) preparation.

Optimal physical preparation would include ensuring that all necessary equipment and back-up personnel are available and fully functional (consider the situation of the undercover officer whose communication equipment failed).

Optimal OPS preparation would include maximum reassurance of the ready availability of support immediately prior to the officer entering the hazardous or stressful situation and activity. And, more generally, would include the comfortable and comforting knowledge that one’s fellow officers fully endorse and are in sympathy with the action being taken (in contrast to the quite overt attitudes of fellow officers about child protection work).

Macro-ergonomics strategies

Several of the macro-ergonomics strategies suggested here have direct implications for the micro-ergonomics ones, in that they will be reflected in the skills, the personality strengths and resources, the attitudes and knowledge, and the over-all preparedness with which an officer is equipped when facing any stressful situation or demand. Formal scientific evaluation of the strategies suggested below may not have been undertaken within the Service. However, the suggestions below are consistent with recommendations made in papers cited above and also with academic theory. It is acknowledged that there have been some relatively recent criticisms of critical incident stress debriefing but it is not the burden of this paper to enter that area of argument. The suggested strategies include:

- More stringent selection: development of formal selection criteria, since (as noted previously) the present practice for specialist areas is largely fortuitous—based on selection of officers who may have shown some interest or apparent aptitude for
an area of work; or simply to have been assumed to be suitable because of some superficial concordance between person and duty requirements (eg allocation of a female officer to child protection work because it is seen as a more feminine activity).

- Rigorous evaluation: employment based on a system that requires consideration of a combination of past performance, aptitudes, interests, and appropriate, comprehensive psychometric testing.

- Much better preparation and training: development of specific (and compulsory) educational programs about the most commonly encountered sources of stress; an awareness of the symptoms of stress; effective ways of countering stress arousal; and management of post-trauma stress.

- Conscious and widespread organisational attitude change: recognition of the need to make stress and its concomitants properly recognised and accepted, with referral (by self or by a senior officer) to the Psychological Unit or to the Police Welfare Unit being seen as normal rather than a non-erasable blot on one’s career aspirations.

[Suitable reorientation training for senior officers would be a necessary part of any attempt to change the organisational ethos.]

- Provision of suitable counselling: allocation of resources for appropriate and timely counselling following any traumatic or intensely stressful exposure—as recommended in several of the reports prepared specifically for the former Police Service. [The term Critical Incident Stress Debriefing should be avoided because of its negative connotations and some adverse opinions that have been expressed about its value. Any psychological intervention can only be as effective as the quality of the relationship between counsellor and counselee permits].

- Job rotation: implementation of a strict policy of limited retention in any of the more stressful activity areas in order to reduce the cumulative effect of stress exposure; routine transfer/rotation to a less stressful or demanding area based on an established scale of potential exposure; and acknowledgement that while the nature, intensity, frequency and/or duration of exposure to significant stressors will be higher in some specialist areas than in others, there is no area of activity, including General Duties, that could be regarded as devoid of stress exposure.

[The rotation or transfer system does not need to be tied to any regular psychological testing or evaluation, but should be totally routine and procedural.]

CONCLUSION

Police officers unavoidably experience a greater exposure to occupational and organisational stressors than do many other professions. There is ample information available to police employers about this exposure, its common effects and reasonable preventative actions. Appropriate efforts at the macro-ergonomics level would beneficially affect the micro-ergonomics situations, including the demands experienced and the reactions invoked in and from individual officers in stressful or traumatic confrontations. The failure to have effectively implemented changes at the macro-ergonomics level has resulted in many of the micro-ergonomics interactions being more stressful than they should or could be, with the cumulative effects of stress exposure being so injurious as to cause the termination of an officer’s employment as *Hurt on Duty*.

REFERENCES

Sources listed in the annotated bibliography of section 5 are not repeated here.


About the authors

Neil L Adams PhD  
Corresponding author  
Email: doctergo2@bigpond.com

One of the old guard of the Society, Dr Adams, now a Fellow, has been working in Ergonomics and intermittently in the Society in various committee positions since the early 1970s, when he had already been teaching high school maths and science, and subsequently University level psychology, for about
twenty years. His foray into ergonomics and, more
general, occupational safety began in the late sixties
when the Port Kembla steelworks (John Lysaght)
invited him to give their management personnel some
lectures on Occupational Safety. Undeterred by his
own ignorance of that field (a characteristic that
prevails to this day) he prepared some material, gave
the lectures, and from there moved eventually into the
esoteric field of expert witness which has lead to the
current interest in the topic of this paper. He’s not kept
track of publications, having left the publish or perish
field of university work nearly twenty years ago, but
has a vague recollection of having had some 70 or 80
papers published or presented at conferences of various
kinds. He is now quasi-retired in a lakeside home on
the far south coast of NSW.

Neil D Adams BSc (Hons), M Ergonomics & Safety
Management, Dip Adult Education

Neil D (son of Neil L Adams) is an ergonomist and
safety management consultant. He has spent the last
decade working (both as an independent consultant
and collaboratively with other professionals) for a
broad range of clients on both preventative and
forensic aspects of ergonomics and safety. Examples
of recent proactive work include: evaluating inherent
requirements of bus drivers for the State Transit
Authority; providing ergonomic input into the re-
design of workstations within the Collins Class
submarine; and undertaking ergonomics assessments
and making recommendations for workstation layouts
and equipment for office workers. He has conducted
over 1000 forensic inspections and prepared detailed
reports considering relevant ergonomic and safety
management factors in relation to alleged incidents
of serious injury. He has also for several years
participated in the committees that have developed and
revised various Australian Standards for Slip Resistance
and for Building Design for Accessibility.
Book Review

Beyond Human Error: Taxonomies and Safety Science

Brendan Wallace and Alastair Ross

Published by CRC Press, a member of Taylor & Francis Group, Boco Ratan, USA, 2006.

Keywords: safety, science, philosophy, complexity, taxonomies, accidents, research, methodologies, prevention, management, engineering, systems, processes, ergonomics, humans [suggested by the reviewer]

In the Foreword the authors discuss the prevalence of a large volume of how-to-do-it texts that in general have a limited appreciation of the complexity involved in understanding the interaction between technology and human factors. The book addresses that problem and provides a well-developed argument for the primacy of human systems in any attempt to identify safe workplace systems. The two Scottish authors have long experience as academics and as safety consultants. Wallace is a Research Fellow in the Sociology Department at the University of Glasgow; Ross is a Senior Research Fellow at the Centre for Applied Psychology at the University of Strathclyde.

The book’s argument is developed through nine chapters:

- Safety and Science;
- Safety and Taxonomies;
- Taxonomic Consensus;
- Taxonomic Outputs and Validity;
- Psychology and human Factors;
- Cybernetics and Systems Theory;
- Challenger and Columbia;
- Rules and Regulations;
- Conclusion; and
- Appendix: Carrying out a reliability trial.

The authors state:

This book is about the theory and practice of safety science. Specifically it argues that many of the current practices in the field are fundamentally misguided and that only a radical revision of the fundamental philosophy of the area will lead to success in what practitioners and researchers are supposed to be doing: reducing accidents and promoting safety.

The book covers some familiar ground for many safety professionals but places emphasis on a social psychology framework rather than one of engineering. It suggests that systems rather than processes are the key to understanding safety issues. They stress the need for academic theory, hypothetical models and abstract laws rather than a sole reliance on practical experience when dealing with specific situations. Surely ergonomists would recognize the value of a combination of these approaches. Chapters 1 & 2 give a reasoned and in-depth analysis of this dichotomy and provide lengthy reference lists.

Chapters 3 & 4 deal with the practical application of the theories examined in detail in the previous two chapters. There are clear explanations of why things / people do, or do not, perform as intended. The authors’ approach is very much along the lines of systems complexity researched by the present reviewer. It is hardly surprising therefore to find that she supports this approach and their concern that, despite decades of cogent argument against its use, null hypothesis testing is still prevalent, something that should concern all of us.

The authors spend some time discussing the confusion surrounding probabilistic reasoning based on a null hypothesis. This is the old dilemma of the Newtonian binary approach of black or white—a simple binary yes/no checklist that ignores incremental items. Wallace and Ross state that: Real science is not binary or digital but analog and fuzzy and it always has been. They suggest that pseudoscience tries to make yes or no decisions but science just makes some theoretical decision to some degree more likely. They conclude that a null hypothesis gets authors published in journals because:

- it pleases regulators looking for test results/safety cases; and
- underpins almost all theory put forward at conferences about the way the safety and risk world is.

There are several pages of examples to raise the reader’s awareness of the logic of the argument and the reasons why the binary approach has persisted. There is further discussion of the basis for an alternative approach based on scientific criteria. Finally in this section the authors hope the reader will understand their support for Byrne: Classification is perhaps the most important way in which we can understand a complex non-linear world. (Interpreting Quantitative Data, Sage, Thousand Oaks, CA, USA, 2002, pp 127–128)
Wallace and Ross are of the opinion that safety management is not science based on the best guess from information available—no more and no less. Therefore the key is to seek patterns since linear causality does not apply. They propose seeking models of systems rather than decisions based on very strict propositions involving individual variables. This is in line with Gibbs’s *Safety is a Fuzzy Word*, published in *Ergonomics Australia*. (Vol 16. Num 1, March 2002, pp 8–38)

In Chapter 5 this approach is continued in a discussion of cognitive ergonomics and psychology. Here they explain how descriptions of unverifiable inner states can make reliable error and accident descriptions even less reliable. They claim this has led to a field of practice that is even more jargon filled and empirical than before. There is a detailed outline which describes the elements of this approach and the realization that human error is situational—actions relate to a specific social situation. (Heidegger M, Being and Time, trans Macquarrie, Robinson, Blackwell, Oxford UK 1978)

Wallace and Ross thus consider old-fashioned cognitive psychology failed to realize its promise since it focussed on alleged cognitive mechanisms as the source of error rather than the social world in which humans live and work.

Chapter 6 discusses circular causality by which they show how things cause themselves to happen by way of undesirable feedback (think of microphones). Cybernetics is concerned primarily with systems theory and human behaviour. Downstream it relates to open and closed systems and interactive complexity. The authors suggest that some normal accidents are literally inevitable because of the tight coupling with non-linear systems. Here there are examples, from Space flight, nuclear defence and petroleum industries.

These examples lead directly into Chapter 7’s detailed examination of the Challenger and Columbia disasters. This section is handled objectively and accurately given the exhaustive official investigations and subsequent scrutiny world-wide by academics and students in faculties of applied science, engineering, human behaviour and communication.

Unfortunately the book’s editor failed to correct the erroneous date given on page 88, stating that: *The space shuttle Challenger was launched on January 28, 2004 at 11.38 am.* It was in fact launched on January 28, 1986 and preceded the Columbia disaster on February 1, 2003 by some 7 years. These case histories are excellent examples of the culture of drift, groupthink, and managerial accidents in a cultural and historical context. (Challenger had launched and returned nine times prior to the fatal incident.)

In Rules and Regulations, the authors deal with the philosophy of natural law and scientific law and the gradual evolution of a context specific nature of framework law. Such ideas remain controversial in some circles. However they are very significant in determining which laws are relevant to particular situations and which are useful for making reasonably accurate predictions.

Wallace and Ross discuss the way in which the idea that science sought objective laws has impacted on safety science and led to a belief that accidents are caused by the breach of a rule—either deliberate or inadvertent. The thought of any accident occurring without human error was barely considered in that scenario. This inevitably led to a highly specific conception of the nature of expertise and what was an expert.

The final argument is well reasoned and includes practical illustrations of the various issues relating to rules, their sociology, their impact on training and emergence as well as the transitional states of dynamic systems. It reviews the social view, accident statistics, locus of control, attribution theory and empowerment in an overall systems performance. Finally Wallace and Ross argue that we should replace the pyramid model of both science and organizations with its emphasis on rules, with a patchwork quilt model based on cases. They favour the bottom-up rather than top-down approach and believe that the workforce is the expert and safety managers are facilitators, using taxonomy theory to achieve desired ends. Thus taxonomy theory works by helping systems self-organize and helping to empower staff create their own solutions to safety issues.”

This book deserves to be read by all safety science students, academics and professional consultants.

*Shirleyann Gibbs PhD*

*Safety Scientist*
**Crossword Solution**

![Crossword grid]

**Clues Across**

1. What we all work for - used to be 28-down ie NOHSC (8)
2. 28-down ie NOHSC (8)
3. Burn a candle? ie an anagram of ‘a candle’ Too many of these per square meter ie too bright a surface, the unit of brightness is candelas/sq metre causes too much 3-down stress on 16-across the eye (7)
4. Reverse this rod = dor backwards and you’ll find it in 16-across ie rod cells in the eye (3)
5. Properly acclimatised Bob, at first, ie the 1st letters in 16-across was certified by it professional affairs board of HFESA (1,1,1)
6. I want a good one ie a run for my money (3)
7. Drove one of these a KIA car and died in the war KILLED IN ACTION (3)
8. Sounds like the sound of ‘cop’ and ‘sock’ footwear for the Viking plod COPSOQ ie a sock for the danish/viking policeman (plod) helps assess psychosocial hazards (1,1,1,1) copenhagen psychosocial questionnaire (1,1,1,1)
9. See the eye sees … it sounds like assent eye and aye sound the same (3)
10. If 35-cross SPL sound pressure level gets too high this is what happens to your hearing a hearing loss (4)
11. 13 I want a good one ie a run for my money (3)
12. Drove one of these a KIA car and died in the war KILLED IN ACTION (3)
13. Sounds like the sound of ‘cop’ and ‘sock’ footwear for the Viking plod COPSOQ ie a sock for the danish/viking policeman (plod) helps assess psychosocial hazards (1,1,1,1) copenhagen psychosocial questionnaire (1,1,1,1)
14. See the eye sees … it sounds like assent eye and aye sound the same (3)
15. If 35-cross SPL sound pressure level gets too high this is what happens to your hearing a hearing loss (4)
20 Modus operandi often abbreviated as MO is also a
government department. A Medical Officer is a member
of the Australian Medical Association - AMA (1,1)
21 Californian soap the OC - Orange County is a
salacious soap opera on TV loves dirt ie salacious (1,1)
25 2-down A London street, A ‘Strand’, a Greek letter
Rho and an Indian dish dahl ‘wrote the book’ on
physical work (7,6) Astrand and Rodahl - Textbook of
Work Physiology
27 Sounds like taking down the notice design as in ‘de
myelinate’ or ‘de bark’ a tree but it’s the design stage
where we all want input (6)
29 Crazy Andy and the little microphones abbrev =
mics, anagram of ‘andy ’ + ‘mics’ to give ‘dynamics’
studied 36-down power, 4-down force etc (8)
 dynamics as a term used in mechanics and physics
31 The fish snook at Liberty Slover Snook worked at
Liberty Mutual Insurance in the USA makes very useful
tables the ‘Snook Tables’ for assessing physical work (5)
32 Almost ends the prayer amen without the a, half of
what 27-across is about design is for people, 50% are
men (3)
33 Sounds like something for the bowler ‘an over’,
helps avoid 24-down bias when making conclusions
(1,1,1,1,1) ANOVA as a way of objectively testing
an hypothesis

Clues Down

1 Masticate ie rearrange ‘crook chews’ to get
workchoices that impede 1-across make work
less safe and increase 3-down stress on employees (11)
2 See 25-across
3 First south s the 1st letter of south and a plait of girl’s
hair tress gives stress which some say can cause
premature baldness? (6)
4 Jedi they use ‘The Force’ coercion to force someone
to do something ? (5)
5 London lane Drury Lane currently down under in
Australia with 42-across Wendy Macdonald (5)
Colin Drury is currently at LaTrobe
7 A jog? a run 1st name Arun of a US colleague (4)
Arun Garg is a US researcher
8 An Macintosh an ‘apple’ mixed with a dark Freudian
drive the ‘Id’ ? together they make ‘applied’ ‘If
ergonomics is not this it is nothing!’ (7)
11 ...if! (2)
12 Captain Picard’s of Star Trek nemesis The Borg are
Star Trek baddies tells him how hard he’s working (4)
the Borg Rating of Perceived Exertion Scale
18 ...or over seas, at first the first letters of Dr Over Seas
= OOSOccasional Symptom Syndrom they sometimes called it
‘kangaroo paw’ OOS was sometimes referred to as
this , especially in the UK (1,1,1)
20 UK football club Manchester United often referred to
as ‘ManU’ on a temporary shelter ‘teni’, give or take
an electron ion, atom + or - an electron safely moved the
French patient? (11) Manipulation was developed in
France for handling patients
22 see 42-across
23 Ed went back ‘ed’ becomes ‘de’ and published a tract
that brought the logarithmic scale decibel into
disrepute ‘libel’ ! (7) this was a mistake as there is
no c in the clue ! de + libel libel
24 lawn Bowlers can’t do without it bias on their balls ,
researchers hate it (4)
26 Nervous mannerism tic and a special breakfast cereal
for women special ‘K’? Correct ! tick = tick
28 Sounds like a bit of this nosh ie food is nice when
you’re peckish when NOHSC is spoken it sounds like
‘nosh’, some also used to say ‘nosh’ to mean ‘NOHSC’,
although some believe it was a pity that DEWR
gobbled it all up! (1,1,1,1,1)
30 Haven’t seen this before, something novel is new
let’s print it! novels are printed (5)
34 Sounds like the blokes in the dunny, lumen sounds like
‘loo’ ‘men’ comes from 37-across lumen is a measure
of luminous flux coming from a light source (5)
36 Probationer P debtor is an ‘ower’ someone who owes
? He went off turn off the power and it went dark
lights go off (5)
40 Mixed up girl Sue becomes ‘use’ says this is what
you do with a good tool! ie use it (3)
43 Gas lost direction neon without the 2nd n (n= north)
joined some tories (neo conservatives) and invaded Iraq
neo conservatives in USA the promoters of the iraqi
invasion (3)
44 I’ve a hankering a yen for some XXXX four x
pronounced as forex (foreign exchange) and
yen is a foreign currency (3)
45 Just say in the beginning first letters of Just Say In =
JSI that 7-down worked on its development (1,1,1)
Arun Garg developed the Job Strain Index (JSI) in the
USA
46 Aussie physicans Australian Medical Association =
AMA = ama found hiding in the Middle Eastern
terrorist group! Hamas (1,1,1,1)
1. DISCOUNTS FROM BOOK AND JOURNAL PUBLISHERS FOR HFESA MEMBERS

The HFESA has been striving to increase the benefits that its members receive from the Society, especially in relation to professional development opportunities.

Negotiations have taken place with a number of the premier publishers of human factors and ergonomics-related books and journals and we are pleased to offer members of the HFESA a number of discounts from the following publishers:

- 15% off the listed price of any book from Blackwell Publishing;
- 20% discount off select titles from Human Kinetics;
- 15% discount off select book titles from John Wiley & Sons;
- 15% off the listed price of any book from Lawrence Erlbaum Associates;
- 15% off a subscription to the Human Factors Journal, the Journal of the US Human Factors and Ergonomics Society, 4 issues a year;
- 30% off a subscription to Applied Ergonomics from Elsevier in 2007, 6 issues a year (discounted price of US$225);
- a discounted price of US$225 for a subscription to the International Journal of Industrial Ergonomics from Elsevier in 2007, 12 issues a year;
- a discounted price of US$97 for a subscription to the Journal of Biomechanics from Elsevier in 2007, 16 issues a year;
- a discounted price of US$140 for a subscription to the Journal of Safety Research from Elsevier in 2007, 6 issues a year;
- a discounted price of US$178 for a subscription to Safety Science from Elsevier in 2007, 10 issues a year; and
- 20% off the listed overseas rate price of the Ergonoma Journal, 4 issues a year.

To find out how you can obtain your discount, simply log on to the members-only HFESA webpage at www.ergonomics.org.au

Rebecca Mitchell and Angela Summers

2. SUBSTANTIAL CHANGES ARE AFOOT FOR POSTGRADUATE ERGONOMICS PROGRAMS AT UQ.

The (possibly) good news for some is that, from 2008, the programs will be available in fully external mode. The downside is that the frequency with which some courses (subjects) will be made available will decrease and consequently the programs can only be completed part-time from 2007.


Robin Burgess-Limerick PhD CPE
robin@hms.uq.edu.au

Associate Professor
ph. +61 7 3365 4718
Postgraduate Ergonomics Coordinator
fx. +61 7 3365 6877
School of Human Movement Studies
mb. 0401 714 511
The University of Queensland 4072
AUSTRALIA

3. BARBARA MCPHEE MINISTERIAL APPOINTMENT

Barbara has been appointed (by the Minister responsible for Mining) as a Member of the NSW Mine Safety Advisory Council. This is the peak body responsible for occupational health and safety (OHS) in mines. It is a great honour and Barbara is proud to have been nominated by the Chief Inspector of Mines. The Council is keen to promote the ‘health’ side of OHS after many years of concentrating on safety things that go ‘bang’ and ‘thump’. After 15 years in mining she feels that we are making progress on OH.

David Caple supplied this item originally to the Ausergo list server and it is reproduced here as not all members may use this service. David added that having been a Ministerial Appointee for the last 4 years on the OHS Advisory Committee in Victoria he is sure that she will find this a fascinating role in exploring the political processes of negotiation with key stakeholders.
4. **IADIS INTERNATIONAL CONFERENCE, LISBON, PORTUGAL INTERFACES AND HUMAN COMPUTER INTERACTION 2007**


(part of the IADIS Multi Conference on Computer Science and Information Systems)


*Conference background and goals*

The IADIS Interfaces and Human Computer Interaction (IHCI) 2007 conference aims to address the main issues of concern within Interface Culture and Design with a particular emphasis on the affective aspects of design, development and implementation of interfaces and the generational implications for design of human and technology interaction. This conference aims to explore and discuss innovative studies of technology and its application in interfaces and welcomes research in progress, case studies, practical demonstrations and workshops in addition to the traditional submission categories. This conference aims to cover both technological as well as non-technological issues related to these developments. Main tracks have been identified (see below). However innovative contributes that don’t fit into these areas will also be considered since they might be of benefit to conference attendees.

* Format of the Conference*

The conference will comprise of invited talks and oral presentations. The proceedings of the conference will be published in the form of a book and CD-ROM with ISBN, and will be available also in the IADIS Digital Library ([http://www.iadis.net/dl](http://www.iadis.net/dl)). The best paper authors will be invited to publish extended versions of their papers in the Human Technology Journal: An interdisciplinary Journal on Humans in ICT Environments (ISSN: 1795-6889) and also in the IADIS Journal on Computer Science and Information Systems (ISSN: 1646-3692).

* Secretariat*

IADIS Secretariat -IADIS INTERNATIONAL CONFERENCE INTERFACES AND HUMAN COMPUTER INTERACTION 2007 Rua Sao Sebastiao da Pedreira, 100, 3 1050-209 Lisbon, Portugal E-mail: secretariat@ihci-conf.org Web site: [http://www.ihci-conf.org/](http://www.ihci-conf.org/)

* Program Committee*

Interfaces and Human Computer Interaction 2007 Conference Program Chair Katherine Blashki, Deakin University, Australia

* General MCCSIS Conference Co-Chairs:*

Piet Kommers, University of Twente, The Netherlands
Pedro Isaías, Universidade Aberta (Portuguese Open University), Portugal
Nian-Shing Chen, National Sun Yat-sen University, Taiwan

* Committee Members: *

* for committee list please refer to [http://www.ihci-conf.org/committees.asp](http://www.ihci-conf.org/committees.asp)

5. **ANNOUNCEMENT AND CALL FOR PARTICIPATION AE INTERNATIONAL 2008**


Jointly with 12th International Conference on Human Aspects of Advanced Manufacturing (HAAMAHA), 14 - 17 July 2008, Caesars Palace

- Las Vegas, Nevada USA Under the auspices of 7 distinguished international boards of 167 members from 29 countries

**Objective and Areas of Interest**

You are cordially invited to participate in AE International 2008 and the affiliated HAAMAHA conference which are jointly held under one management and one registration. The conference objective is to provide an international forum for the dissemination and exchange of scientific information on theoretical, generic, and applied areas of ergonomics, including, physical ergonomics, cognitive ergonomics, social and organizational ergonomics, ergonomics modelling and usability evaluation, healthcare and special populations, safety and ergonomics in manufacturing. This will be accomplished through the following six modes of communication: keynote presentation, parallel sessions, demonstration and poster sessions, tutorials, exhibitions and meetings of special interest groups. The four-day conference will start with tutorials. The tutorials will be held on July 14, 2008. Tutorials will be offered (both half-day and full-day) at introductory, intermediate, and advanced levels covering the entire spectrum of the conference.

All submitted abstracts will be peer-reviewed by three independent referees from the international program boards. It is anticipated that a broad range of research and applied topics will be covered during the conference. Papers in the theoretical category should deal with models, concepts, and structures; papers in the generic category should present research results of broad applicability; and in the applied category should show how the demands of particular application areas shape the way generic research is translated into practical innovation.
Proposals for Participation

Parallel presentations. An abstract of about 800 words should be submitted through the web and should include a statement of the objective and significance of the proposed presentation, a description of methods, and a discussion of results.

Poster/demonstration sessions. This session has been especially designed to accommodate the presentation of late-breaking scientific and professional news, work in progress, work which can be more effectively presented via demonstration or when the author feels more comfortable presenting the material in written form or demonstrating it rather than by oral presentation. An abstract of 300 words should be submitted through the web and should include the essence of the planned presentation.

Special interest groups. The objective of these sessions is to bring together Conference participants to discuss a topic of common interest. An 800 word abstract should be submitted through the web and state the objective and significance of the session, potential participants (or how participants will be selected), format of session, and anticipated duration.

Tutorials. An abstract of 300 words should state the objective, content, target audience, a bio-sketch about the presenter(s) and A/V requirements. Indicate whether the proposed tutorial is for a half-day or full-day.

Please submit all abstracts through the conference web site: www.AEI2008.org

Summary of Submission Requirements & Deadlines

<table>
<thead>
<tr>
<th>Abstract Length</th>
<th>Deadline for Abstract Receipt</th>
<th>Notification of Review Outcome</th>
<th>Deadline for Receipt of Accepted Proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posters/demonstrations</td>
<td>300 words</td>
<td>1 April 2008</td>
<td>*</td>
</tr>
<tr>
<td>Special interest groups</td>
<td>800 words</td>
<td>15 Oct 2007</td>
<td>20 Dec 2007</td>
</tr>
<tr>
<td>Tutorials</td>
<td>300 words</td>
<td>15 Oct 2007</td>
<td>20 Dec 2007</td>
</tr>
</tbody>
</table>

All submissions should be done through the website: www.AEI2008.org
6. 43RD ANNUAL CONFERENCE OF THE HUMAN FACTORS AND ERGONOMICS SOCIETY OF AUSTRALIA

A Healthy Society: Safe, Satisfied and Productive
26–28 November 2007

Calling for Expression of interest for the next conference of the Human Factors and Ergonomics Society of Australia. Please register your interest with the secretariat at enquiries@keynotewa.com

Jenni Miller and Ian Gibson
Co-chairs

7. EIGHTH PAN-PACIFIC CONFERENCE ON OCCUPLATIONAL ERGONOMICS (PPCOE 2007)

On behalf of the Organizing Committee, I would like to invite you to attend and present your research results at the, which will be held in Bangkok (Thailand) during October 17-19, 2007 at the Sofitel Central Plaza Hotel. The PPCOE 2007 will be hosted by the Ergonomics Society of Thailand (EST).

The PPCOE 2007 is intended to provide a forum for international researchers and practitioners to meet and share current issues and problems regarding ergonomics, safety, and health found in working and daily life. Case studies and research results on ergonomics and related issues from countries in the Asia-Pacific region and beyond will be reported and discussed. Ideas will be exchanged and research collaborations are expected to be initiated as a result of this conference.

For more information on PPCOE 2007 and the abstract submission, please visit the conference web site: http://www.est.or.th/ppcoe2007. Abstracts can be submitted to the Conference Secretariat at ppcoe2007@est.or.th.

I will be very grateful if you would help to pass this information to your colleagues who might be interested in attending this conference. I look forward to meeting you at the PPCOE 2007 in Bangkok, Thailand.

Sincerely,
Suebsak Nanthavanij, PhD
(President, Ergonomics Society of Thailand)
Management Technology Program
Sirindhorn International Institute of Technology, Thammasat University, Thailand

8. ERGONOMICS 2007
(Stubicke Toplice/Zagreb, CROATIA.

We invite you to participate in the 3rd International Ergonomics Conference, in Croatia

First Call for Papers
Deadlines:
Authors Notification of acceptance: April 15, 2007
Full papers: May 15, 2007
For submissions of papers, please go to the web site:
http://www.croergosociety.hr

9. INTERNATIONAL CONFERENCE ON SLIPS, TRIPS, AND FALLS 2007: FROM RESEARCH TO PRACTICE

IEA Technical Committee on Slips Trips and Falls would like to invite you to submit abstracts for presentations at the International Conference on Slips, Trips, and Falls 2007: from Research to Practice, sponsored by International Ergonomics Association, The Ergonomics Society, U.K., and Liberty Mutual Research Institute for Safety, USA. The conference will be held on August 23 - 24, 2007 at Liberty Mutual Research Institute for Safety, Hopkinton, MA, USA.

The main purpose of this conference is to provide a technical forum on slip, trip and fall incidents for the safety researchers and consultants around the world to present their latest findings and to exchange research ideas. Papers that address industrial safety as well as safety at home and during leisure-time are all welcomed. The conference will be divided into the sessions of tribology, biomechanics, accident analysis, and injury prevention.

Deadlines:
Abstract submission: February 28, 2007
Acceptance notification: March 15, 2007
The full paper due: May 31, 2007

Detailed conference information will be posted at http://www.slipstripsfalls.org. Each paper will be allocated up to five pages in the conference proceedings.

Abstracts can be sent by e-mail directly to Dr. Chien-Chi (Max) Chang, Communication, IEA Technical Committee on Slips, Trips and Falls, E-mail: chien-chi.chang@libertymutual.com. Max can also be reached at 1-508-497-0260 (voice) or 1-508-435-8136 (fax).
Conference Technical Program Committee:

Wen-Ruey Chang, Ph.D. (Chair), Liberty Mutual Research Institute for Safety, USA

Raoul Grönnqvist, Ph.D., Finnish Institute of Occupational Health (FIOH), Finland

Roger Haslam, Ph.D., Loughborough University, UK

Sylvie Leclercq, Ph.D., French National Research and Safety Institute (INRS), France

Hisao Nagata, Ph.D., Japan National Institute of Occupational Safety and Health, Japan

10. FRENCH CONNECTION

I have been seconded to France, for 3 years, as a Research Director with the French National Institute for Transport and Safety Research (INRETS). I start on 1 April and will be based in Lyon, with my family. I’ll spend most of my time with the INRETS Laboratory for Ergonomics and Cognitive Sciences for Transport (LESCOT), and about a week a month at INRETS’ Modelling, Simulation and Driving Simulators (MSIS) laboratory, in Paris. I’ll create and contribute to French national and European-Commission funded projects in transportation human factors, develop new research collaborations between Monash University, INRETS and other European institutes and supervise PhD students.

I will also have a Professorial appointment with a university in Sweden. A major focus of the research will be HMI design and evaluation for the automotive industry, which will compliment similar research we are currently undertaking for the Australian automotive industry as part of the Cooperative Research Centre for Advanced Automotive technology (AutoCRC). If you are passing through France, it would be nice to see you. I’ll give the ESA secretariat my new contact details after I get to France.

Michael Regan, PhD
Associate Professor and Senior Research Fellow, Level D Accident Research Centre Monash University AUSTRALIA

Note New Email Address: michael.regan@muarc.monash.edu.au

11. IMPORTANT NOTICE TO ALL CPEs FROM PAB

(And if you are not yet one, do take notice as well—it will affect you if you don’t become one.)

You know, or should know, that prospective ergonomics clients who refer to our society website and who want an ergonomist are directed to, and only to, the list of CPEs.

As a CPE, it is your responsibility to ensure that your persona listing in the directory of CPEs is both accurate and interesting to prospective clients.

This is particularly important now that there is no published hard copy directory that can be sent to potential client companies such as federal, state and local government bodies.

Neil L Adams PhD CPE
Conference Calendar

2007

19–21 March 2008 – Organizational Design and Management Symposium
Guarujá, São Paulo, Brazil
The website for the symposium is:
Contact: Patricia Monteiro, Convenor of the Symposium:
Depto. de Engenharia de Produção - POLI/USP
Tel: (11) 3091-5363 - Ramal 434
Fax: (11) 3091-5399
Horário: 08h00 às 14h00
patricia.monteiro@vanzolini.org.br
<http://www.pro.poli.usp.br/pro/odam2008/>

Work with Computer Systems – Computer systems for human benefits
Stockholm, Sweden
Internet: www.wwcs2007.se

13–16 June, 2007 – Ergonomics 2007 Croatia
Stubick Toplice/Zagreb, CROATIA.
First Call for Papers
Deadlines:
Authors Notification of acceptance: April 15, 2007
Full papers: May 15, 2007
For submissions of papers, please go to the web site: http://www.croergosociety.hr

6–8 July 2007 – IADIS INTERNATIONAL CONFERENCE, LISBON, PORTUGAL
Interfaces and human computer interaction 2007
IADIS Secretariat:
Rua Sao Sebastiao da Pedreira, 100, 3 1050-209
Lisbon, Portugal
E-mail: secretariat@ihci-conf.org
Web site: http://www.ihci-conf.org/

23–24 August 2007 – International conference on slips, trips, and falls 2007: from research to practice at Liberty Mutual Research Institute for Safety, Hopkinton, MA, USA.
Detailed conference information will be posted at http://www.slipstripfalls.org.
Contact: Dr. Chien-Chi (Max) Chang,
Communication, IEA Technical Committee on Slips, Trips and Falls,
E-mail: chien-chi.chang@libertymutual.com.
Tel: 1-508-497-0260
Fax: 1-508-435-8136

Boston, USA
Pre-Conference Workshops: 26 August 2007
PREMUS 2007 is the first time the conference will be held in the United States.
For more information about this program, visit: www.premus2007.org or Email: premus@premus2007.org.

Sofitel Central Plaza Hotel, Bangkok, Thailand
Hosted by the Ergonomics Society of Thailand (EST)
For more information on PPCOE 2007 and the abstract submission, please visit the conference web site: http://www.est.or.th/ppcoe2007. Abstracts can be submitted to the Conference Secretariat at ppcoe2007@est.or.th.

11–14 November 2007 – International Graphonomics Society
13th biennial conference, Melbourne, Australia
Contact: Dr Jim Phillips
Conference Co-Chair & Organizer IGS 2007
Email: jim.phillips@med.monash.edu.au
http://www.graphonomics.org/igs2007/

A Healthy Society: Safe, Satisfied and Productive
Perth, Western Australia
Please register your interest with the secretariat at enquiries@keynotewa.com
Jenni Miller and Ian Gibson
Co-chairs

2008

19–21 March 2008 – Organizational Design and Management Symposium
IEA Technical Committee on Organisational Design and Management (ODAM)
Guarujá, São Paulo, Brazil (a top spot by the beach!)
The website for the symposium is:
http://www.pro.poli.usp.br/pro/odam2008/
Contact: Patricia Monteiro
Depto. de Engenharia de Produção - POLI/USP
Tel: (11) 3091-5363 - Ramal 434
Fax: (11) 3091-5399
Horário: 08h00 às 14h00
Email: patricia.monteiro@vanzolini.org.br
Inquiries
All advertising inquiries should be directed to the National Secretariat of the Society.

Contact
The Human Factors and Ergonomics Society of Australia Inc
P.O. Box 7848 Balkham Hills BC NSW 2153
Tel: +61 2 9680 9026 Fax: +61 2 9680 9027
E-mail: secretariat@ergonomics.org.au

Size
The finished page size of the Newsletter is A4 (210mm x 297mm)

Printed column sizes are 165mm x 225mm (double) or 80mm x 225mm (single)

Advertising Copy
Must be camera ready and must arrive at the HFESA Federal Office by the Copy Deadline Submission Date for the Edition in question.

A professional advertising service is available for producing camera ready copy if required. For further inquiries regarding this service contact:
Rates for Advertising

These rates are inclusive of GST

<table>
<thead>
<tr>
<th></th>
<th>Full page</th>
<th>1/2 page</th>
<th>1/4 page</th>
<th>1/8 page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single issue</td>
<td>$330.00</td>
<td>165.00</td>
<td>82.50</td>
<td>41.80</td>
</tr>
<tr>
<td>2 issues</td>
<td>$297.00</td>
<td>148.50</td>
<td>74.80</td>
<td>37.40</td>
</tr>
<tr>
<td>3 issues</td>
<td>$264.00</td>
<td>132.00</td>
<td>66.00</td>
<td>33.00</td>
</tr>
<tr>
<td>4 or more</td>
<td>$231.00</td>
<td>115.50</td>
<td>58.30</td>
<td>29.70</td>
</tr>
</tbody>
</table>

Enclosures

Pre-printed enclosures (leaflets, brochures) etc are welcome for inclusion with the Journal.

Enclosures should be pre-folded to fit inside the finished Journal.

Rates for enclosures

| Enclosure not requiring folding | $412.50 |
| Enclosure requiring folding    | $462.00 |

These rates may increase if the enclosure weighs more than the equivalent of 2 standard weight A4 pages. These rates are inclusive of GST

640 copies should be sent to arrive at the ESA Federal Office by the Copy Deadline Submission Date for the Edition in question.

Address for mailing Advertising copy and/or enclosures

National Secretariat
The Human Factors and Ergonomics Society of Australia Inc.
PO Box 7848 Balkham Hills BC NSW 2153

Advertising copy and enclosure submission deadlines for 2007 are the same as for Contributions — 1st of month prior to publication

Edition | Submission Deadline
---|---
March | February 1
June | May 1
September | August 1
December | November 1

Circulation

The Journal is published four times a year and is received by approximately 620 professional’s Australia wide working in the areas of ergonomics, occupational health and safety, and design.

Ergonomics Australia On-Line (EAOL)

Advertising and sponsorship opportunities also exist in the electronic version of this journal (EAOL) which is managed by Dr Robin Burgess-Limerick at Department of Human Movement at Queensland University. It is downloaded by more than 100 Australian and International readers each week.

To view EAOL: http://www.uq.edu.au or enter via the HFESA website.

Caveats

The views expressed in the Journal are those of the individual authors and contributors and are not necessarily those of the Society.

The HFESA Inc reserves the right to refuse any advertising inconsistent with the Aims and Objectives of the Society and Journal Editorial Policy.

The appearance of an advertisement in the Journal does not imply endorsement by the Society of the product and or service advertised.

The Society takes no responsibility for products or services advertised therein.

Editor

Shirleyann M Gibbs PhD
E-mail: shanng@optushome.com.au