President's Message

Dear Fellow Ergonomes

By the time you read this my term as President will have come to an end and our new helmsman, David Caple, and his team (Tony Payne and Ros Kushinsky) will have been duly installed. It feels an incredibly short time since I took over from Verna Blewett, and it's now my turn to settle into the father-figure role of immediate Past President, where one has neither power nor responsibility, but is freer to tread on toes than the President.

Looking back on the last two years I believe that we have continued to grow in our understanding that we are all part of a national Society, not a loose collection of independent branches located in different States. However, I would reiterate Verna Blewett's observation made some years ago that the life-blood of the Society lies in the branches. The main function of the Federal office (secretariat and executive) is to support and facilitate the efficient and effective operations of the branches, and changes to our operational procedures are intended to further strengthen these aims. It is vital to the overall well-being of the Society that relations between the Federal office and the State branches are on an "us-and-us" not an "us-and-them" basis and I am encouraged to feel that we are making steady progress in this direction.

Two issues stand out in my mind as deserving mention: firstly, that of competencies. The publication of the competencies report is a milestone in the Society's history and the profession of ergonomics in Australia and New Zealand. It
is, of course, not an end but a beginning - the concept of competency-based standards must be used, not buried in dusty pigeon-holes, otherwise the effort will have been largely wasted. At this point, I wish to place publicly on record my warmest thanks to Jim Carmichael for his devoted leadership in this onerous task, and in so doing I do not want to appear to be ignoring the sterling work of the rest of the committee, comprising members from all branches of the ESA and the NZES.

The second issue is that of ethics. I personally have reservations about the value of the proliferation of written codes of ethics in many professions - whilst they may reduce the opportunity for arguments about the propriety of people's actions in certain cases, my own view is that they should not be necessary where basic standards of moral conduct (in the broadest sense) prevail. Now I can hear you saying, "Come on, Gibbo, how naive can you get?" and I know we only have to glance at newspapers or the TV news to realise just how unethical some people are, but I am still prepared to argue my case. Any offers? An area where one is often under pressure to behave unethically is in forensic ergonomics - those of us who spend much time in preparing expert opinions in legal matters know the pressures there are to help one side to win, at any cost, rather than to be objective and unbiased (which we are supposed to be). Protection against these pressures comes, I believe, from our own personal standards, not from an external code of ethics.

Finally, may I say it has been a privilege to serve the Society as President and I am confident that our new team will enable the Society to move forward boldly into the next millennium (sorry folks, but I just had to say it. As Confucius said, "Man who speaks with tongue in cheek is likely to bite off more than he can chew."). Seriously though, we have an Executive and Board who will do the Society proud. And I have never ceased to be amazed at the way in which willing volunteers have appeared to take on tasks and responsibilities for the good of the profession and the Society. I am sure that new names will continue to appear alongside those stalwarts whose names crop up so often in many different placces. I am greatly indebted to many people for their support and encouragement, especially Jenni Miller and Rod Powell, and, of course, the other Ian and Margot in Canberra, who have been unstinting with their wise advice. Numerous people have lightened my load and brightened my days, especially Verna Blewett, but many others too. This partial recital of my indebtedness would oppress me with my inability to repay it, were I not able, like Don Quixote, to salve my conscience, that "if I have not been able to repay the good deeds I receive with other good deeds, I put in their place the desire to do them, and if that be not sufficient, I make them public; for he that tells and proclaims the kindnesses he receives would repay them if he could."

I look forward to meeting new friends and renewing old acquaintances at our next annual conference in Perth in 1999.

Ian Gibson

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Board News
Thanks to Jenni Miller for this photo of the ESA Board taken at the May meeting in Melbourne. From left going round the table, its.... Mike McCracken, Tim Upsdell, Michael Michaliades, Rodney Powell, Jenni Miller, Ian Gibson, Ian Mitchell, Angela Summers, David Caple, Jim Carmichael, Neil Adams and Christine Aickin

A Board teleconference was held late in July. Among the more important decisions and reports were:

**Competencies:** Printing and Distribution of Report see notice in August issue of EA

**Assessment Program:** A sub-committee comprising David Caple, Jim Carmichael, Michael Michaliades and Neil Adams is to design the terms of reference for a consultant who will prepare guidelines for evaluating assessors and measuring membership eligibility.

**Restructuring:** On the evidence that both the Administrative Secretary and the Executive Officer intend retiring in the next half year, the incoming President, David Caple is taking the opportunity to seek advice about restructuring the office and staff work.

**Finances:** The Board considered a report from the Auditor, Arnold Harrington briefly overviewing the Society's financial situation and recommendations. The Treasurer recommended that the Executive take account of the Board's deliberation and submit firm recommendations to the next Board meeting.

**Changes to Affiliate status fees:** It was resolved that on the next occasion fees are changed the fees for Affiliates be set at two-thirds of those for members.

**Logo:** An enquiry has been made by a member who operates a private consultancy and who wishes to add the Society’s Logo to his / her stationery.

Besides indicating an affiliation with the Society it is an opportunity to publicise the Society itself and the discipline of ergonomics.

The Board has approved a set of Guidelines that must be satisfied and it will strictly
monitor their compliance.

There is a Style Manual being written (and should be competed soon) outlining the technical parameter of the logo should members avail themselves of this marketing opportunity.

You will notice that in the first instance, you should write to the Secretariat. As this is a new venture for the Society please bear with us as we sort out the procedures.

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**THE USE OF THE ESA LOGO BY MEMBERS**

**Policy:** It is the policy of the ESA to allow the use of the Society's logo on the business stationery of its authorised members, subject to certain strict conditions.

Only the logo may be used by members under the conditions described in this document and in the Style Manual noted later. Members may not use the Society's Mission Statement or any other Society printable or transmittable material on Members' stationery, home page or fax cover sheet.

**Authorisation:** Members of the ESA must apply to be authorised to use the ESA logo on their business stationery.

Successful applicants will be referred to as "authorised members."

Only members who belong to the membership categories of Fellow; Certified Professional Ergonomist, Member and Retired Member are eligible to apply for the use of, and to use, the logo on agreed stationery.

Affiliates and corporate affiliates are not eligible to apply to use, or to use, the logo on their stationery.

Only individual members of the Society, as detailed above may use the logo in accordance with the conditions set out hereunder. Employees of members who are not themselves members may not use the Society's logo and companies owned or part-owned by members may not use the logo on their own stationery.

The applicability of the eligible members and categories will be reviewed at any time there is a change in the criteria of the various membership levels.

A fee will be charged for the use of the Society's logo.

The period of authorisation is 3 years. Authorised members must re-apply every three years for renewal of the privilege of using the logo for further three-year periods.

Authorised members may be asked to sign a declaration form as to the use of the logo annually.

**Fee:** An annual licence fee is to be paid at the time of annual ESA membership renewal.

The annual licence fee for use of the ESA logo will be determined by the Board.
from time to time. From 1998 the fee will be $100.00 pa.

The Board of the ESA may review and change the annual fee at any time and inform the membership through the Society's Journal, Ergonomics Australia.

The fee set for authorised members will remain constant throughout their three year licence period even though higher or lower fees are set by the Board for subsequent applicants during the period of licence already obtained by individual authorised members.

Use of Logo: The Society will produce a Style Manual containing the conditions under which the use of the Society's logo will be allowed and the technical description of the logo itself.

The use of the logo must be in strict accordance with the Style Manual.

The use of the logo is restricted to business stationery such as letterhead, envelopes, business cards and "With Compliments" slips of the authorised member. The ESA Board must be satisfied that the design of the stationery used by authorised members will cause no possible confusion on the part of consumers of ergonomics services that the authorised member represents the ESA in any official capacity.

The ESA will not in any way be held responsible for any printed or electronically generated material other than the logo, appearing on the authorised member's stationery.

Responsibilities of Members Authorised to Use the ESA Logo: The authorised member must remain a financial member of the ESA while the stationery is being used. Membership renewal fees must be paid by the due date in order for members to be classified as financial and hence eligible to use the logo.

Authorised members must maintain the requirements of the ESA's Code of Practice

Authorised members must submit a copy of the members stationery on which the logo is printed to the Society's Secretariat for record purposes.

Application Procedures: Those wishing to seek authorisation to use the logo must apply to the Executive Officer of the Society for a copy of the Style Manual and an application form.

Completed application will be made to the Society's Secretariat to become an authorised members.

The application for authorisation will include - completed application form; a description of the intended use of the logo; a copy of the member's proposed stationery indicating where it is intended to place the ESA logo on each piece of stationery; a cheque for payment of the first year's licence; a signed declaration that the conditions of use will be observed.

The Secretariat will process the application by checking its details against the Style Manual and Conditions outlined herein and recommend to the Board or to its Executive that the application be approved or rejected.
The Society's Secretariat may seek further details for clarification if required. In addition the Secretariat may seek advice from any member of the Executive if it is deemed necessary.

The Secretariat will convey the Board's decision to the applicant. Written approval must be obtained before printing is arranged and no approval should be anticipated.

On approval, the Secretariat will forward a copy of the logo bromide to the successful applicant.

When the stationery has been printed, the member person will forward a copy of the stationery continuing the ESA logo to the Secretariat for recording.

The Board may delegate to the Executive of the Society or to staff, the authority to process and to approve applications.

Professional Enquiries & Complaints: Over the last few months the Board and the Executive have developed a set of Procedural Guidelines that will assist with the determination of professional complaints that members may bring against other members or even of outsiders seeking redress from the Society over alleged misbehaviour by members.

Although there are no such complaints before the Board, as a Society of professionals in an increasingly litigious Society, it was felt that if the procedures were developed in a calm atmosphere now, once any problem arose it could be handled more expeditiously.

At the last Board meeting it was resolved that members be given the opportunity of commenting on the draft Guidelines, as they now stood, before they were sent for legal opinion.

Accordingly, if members would like to provide input into the draft Guidelines at this stage, their views could be considered and possibly incorporated before the lawyers were consulted. Please send your views to the Secretariat by the end of the year. The accumulation of ideas will then be presented to the new Executive and Board early in the new year.

Professional Enquiries & Complaints Procedures:

As a preliminary to the creation of By-Laws on the Procedures by which any Professional enquiries or complaints may be made to the Society against any member of ESA, the following Guidelines are drafted for consideration.

Range of Complaints:

Complaints and enquiries about the professional conduct of any members of ESA must be submitted to the Society as breaches of any clause listed in the Society's Code of Practice.

At all stages of processing, investigating and evaluating the complaints, the
documentation will be treated as confidential.

**Complaint Procedure:**

All complaints must be made initially to the Secretariat of the Society in written form.

Should any person bring a complaint against the professional conduct of an ergonomist who is not a member of the Society, the Secretariat will advise the complainant that the person is not a member.

The allegation will be recorded and referred to the Executive to decide whether further information is required or whether the complaints can be dismissed as having insufficient information or justification to warrant further action.

If in the view of the Executive, the complaint warrants further action, it will be passed on to the Professional Activities Tribunal (hereafter referred to as the Tribunal), comprising three (3) Fellows of the Society selected by the Board from time to time.

The Tribunal will undertake or cause to be undertaken, an investigation into the complaint. The Tribunal may co-opt appropriate ESA staff, Fellows or CPEs to assist in the investigation.

The task of the Tribunal is to resolve if possible, any grievance brought against a member in the course of that members' professional activities; it is not a court of law.

**Determination of Complaints:**

The Tribunal shall be responsible to determine the extent of the complaint, its justification, the penalties (if any) which should be paid by those who have been found to have acted unprofessionally.

The Tribunal members shall be indemnified against consequential action being taken against it by any person as a result of any determination by that Tribunal.

The Tribunal may suggest further options that either party may take such as mediation or legal action; impose penalties on a member; or recommend restitution by the accused member ergonomist.

All parties will be notified as to the outcome of the Tribunal's deliberation as soon as possible after the determination is made.

**Penalties:**

The Tribunal may determine penalties for professional conduct in the following categories: reprimand; loss of membership status; suspension from membership; expulsion from membership.

**Appeal:**

If the complainant is a member of the Society that member may exercise the right
of appeal against the Tribunal's determination by writing to the Executive within 28 days of receiving the notice.

The member against whom the complaint is directed, may appeal against the determination of the Tribunal by writing to the Executive within 28 days of receiving the notice of determination.

If any member appeals the determination of the Tribunal, the Executive shall refer the matter to the Board of the Society for final determination. The Board shall be provided with all relevant documentation.

The full Board shall act as an Appeal Court. It may call any member to assist or to give evidence before it.

The Board must take into account, but not be bound by, a recommendation from the Executive.

Each case, its treatment and outcomes will be published as a case-study in Ergonomics Australia, but presented as generic material and without any possible reference to or identification of those involved.

Federal Secretariat Contact Details

Ergonomics Society of Australia Inc  Tel:+61 (02) 6242 1951
Canberra Business Centre  Fax: +61 (02) 6241 2554
Bradfield Street
Downer. ACT 2602  email: esa@ozemail.com.au
AUSTRALIA

Business Hours:
9-1 Monday to Thursday
Executive Officer: Ian Mitchell
Administrative Secretary: Margot Lynch

Ergonomics International

IEA home page

The International Ergonomics Association has a home page (web site) on WWW. It includes: Information, Structure, Activities, News (eg. Ergonomics International), Electronic Journal, and IEA 2000. Prof. Markku Mattila of Tampere Univ., Finland (mattila@cc.tut.fi) has responsibility for the home page. The address is www-iea.me.tut.fi/

IEA Web journal

The IEA is setting up a web-based scientific journal: IEA Journal of Ergonomics Research. The refereed articles will cover the entire field of ergonomics. The goal is review within 2 months; publication within 6 months. Three types of articles will
be published: Regular articles (15-40 pages double spaced), review articles and brief (<15 pages) articles. Papers will be published in English; they should be submitted to the Editor or one of the associate editors. For more information, see the IEA wb site www.iea.me.tut.fi/

**MARTIN HELANDER**, Editor, Email: mahel@ikp.LIU.se

**IEA 2000**

The 14th IEA Congress, 30 July to 4 August 2000, in San Diego, CA, USA will probably be the largest ergonomics congress ever held. We anticipate 2500 attendees! Paper sessions will be 14 minutes each (including questions); one page proposals are due 1 July 1999; the papers themselves are due in January 2000. You are also encouraged to organize sessions (5 papers), special symposiums (groups of 2 to 8 sessions), and workshops; proposals are due 16 April 1999. The Congress Proceedings will be available on a CD. Limited hard copies will be available. Plan to bring your family and enjoy Disneyland, Sea World, Hollywood and the other California attractions. The Conference hotel, the Marriot, is on the beach. Mexico is just 30 minutes away. The IEA 2000 web site is [www.IEA2000.HFES.org](http://www.IEA2000.HFES.org) The IEA Secretariat is headed by Lynn Strother, HFES, PO Box 1369, Santa Monica, CA 90406-1369, USA; fax: +1 310 394 2410; Email: Lynn_Strother@compuserve.com; Web: [www.hfes.org](http://www.hfes.org)

**HAL HENDRICK** Chair, IEA 2000 HHendrick@AOL.com

**Farewell**

As of September 1998, the editor of Ergonomics International will be Andy Marshall (email:andy_marshall@compuserve.com). I have been editor since November 1981--almost 17 years. At the start, I not only did the editorial work but duplicated it, stuffed envelopes and mailed it. Next it was published in Ergonomics who also printed and distributed copies. Now it also is sent by email to each of the national societies and the IEA web page; thus it is now available though the web to everyone in the world! What will the next 17 years bring?

**STEPHAN KONZ** Email: sk@ksu.edu

**IEA Executive Changes**

After the Capetown meeting, Pat Scott (South Africa) will replace Kamiel Vanwonterghem (Belgium) as head of the Industrial Developing Countries Committee. John Wilson (UK) will replace Margaret Bullock (Australia) as head of the Professional Practice and Education Committee. Andy Marshall (UK) will replace Steve Konz as Ergonomics International editor. We are certainly very grateful to Kamiel, Margaret and Steve for the work they have done and are doing on behalf of the IEA.

**IAN NOY** President of IEA

**Addresses**

The International Ergonomics Association has an address list (which has the mail
address, the phone number, the fax number and the email number). At present the address list has many blanks for phone number, fax number and email number but we hope to fill in those blanks gradually. The list is available by e-mail, on a 90 mm disc in Word Perfect, and as a printed copy. If you want a free copy, indicate whether you want (1) e-mail of the list, (2) the disc, or (3) the printed list.

ANDREW MARSHALL andrew_marshall@compuserve.com

User-System Interaction

The free 194 page annual report of IPO (Center for Research on User-System Interaction) is available from: IPO, Eindhoven Univ. of Technology, Den Dolech 2, PO Box 513, 5600 MB Eindhoven, The Netherlands: email: iposecr@ipo.tue.nl

The four major research themes of IPO are: * User Centered Design * Multimodal Interaction * Information Access and Presentation * Spoken Language Interfaces

The report, in English, not only includes some of the key research papers of the IPO but also gives abstracts of 87 publications by their staff during 1997.

UK

The Ergonomics Society (UK) web site has been modified. Visit us at www.ergonomics.org.uk/

TIM HORBERRY HSE

I like the web address of the Health and Safety Executive: www.open.gov.uk/hse/hsehome.htm

STEPHEN KONZ

Indian agriculture

"Ergonomics in Agriculture and Allied Activities in India", by L. Gite and G. Singh, is a 52 page booklet published by the Central Institute of Agricultural Engineering, Nabi Bagh, Bhopal 462 038, INDIA. Email: director@ciae.mp.nic.in

The problems addressed are the machine and environmental hazards of the 200,000,000 Indian agriculture workers (35% female). The primary sections of the booklet are "Ergonomics Research in Agriculture" (12 pages),"Studies Related to Equipment Design" (9 pages) and "Occupational Health and Safety" (12 pages).

There are 114 references--primarily Indian.

Certification

A Certification scheme for Ergonomists in New Zealand was officially launched on 1 April 1998; it is administered by the newly-formed Board for the Certification of New Zealand Ergonomists (BCNZE). The scheme is similar to the European scheme (CREE) and will be benchmarked vs it. One change is the addition of an Associate category; it is for individuals who have completed the educational requirements but not the Training/experience requirements. It was considered important to provide support to those aiming to work at a professional level in ergonomics. Senior ergonomists may chose an alternate route (route B) to BCNZE recognition. This involves peer reviewed publication in each of the six core areas.
To date, no applicants have been certified through route B.

**DAVE MOORE** President New Zealand ES Email: dave-moore@clear.net.nz

**Occupational Ergonomics Handbook**


**Vibration**

An American baseball bat manufacturer, Worth Inc. of Tullahoma, Tennessee, has found a way to reduce vibration in the bat upon impact vs a baseball. This vibration reduction increases the bat's "sweet spot" and allows more powerful hits, even if the bat hits the ball "off center". When a sensor in the bat detects vibrations, a circuit has a piezoelectric transducer convert the vibration into energy which leaves the bat as heat from a shunt circuit. Development has already started on vibration damping in golf clubs, tennis rackets, skis, snowboards and mountain bikes. Can damping in drills, hammers, power screwdrivers and other industrial applications be far behind?

**Teams**

*Ergonomics* will have a special issue on team work. We welcome research papers from any domain including, but not restricted to, air and transportation systems, military command and control, medical and emergency services, process control, power generation and distribution, other industrial applications and sports. Both lab and applied studies are welcome. Five copies for review are required by 31 December 1998. Please use the format on the inside back page of any issue of *Ergonomics*. Contact Dr. Neville Stanton, Psychology, Univ. of Southampton, Southampton S01 71BJ, UK (email: nas@soton.ac.uk) or Professor John Annett, Psychology, Warwick Univ., Coventry CV4 7AL, UK (email: J. Annett@warwick.ac.uk).

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**Branch News**

**Australian Capital Territory**

**CHAIRPERSON'S ANNUAL REPORT FOR YEAR 1997/98**
Introduction and Purpose of Report

1. This purpose of this Chairperson's Annual Report is to describe the activities of the Australian Capital Territory (ACT) Branch of the Ergonomics Society of Australia (ESA) during the 1997/98 year and to comment on a way ahead. This report incorporates the Scientific Program Report because, during the reporting period, the Branch Chairperson also acted as the Scientific Program Organiser.

1996/97 Annual General Meeting and Election of Officers for the year 1997/98

2. The 1996/97 Annual General Meeting of the ACT Branch was held at the Ainslie Football Club, on 24 October 1997. During this meeting, the following office bearers were elected for the year 1997/98:

Chairperson Mr Mike McCracken

Treasurer: Ms Margaret Kennedy

Secretary: Ms Jenny Kerr

Committee: Mr Les Hogg, Ms Rhonda Berry, Ms Trish Levick, Ms Margaret Head, Mr Michael Gardiner, Ms Lenore Gunning

1997/98 Meetings

3. Throughout the reporting period, Branch meetings were held monthly at the Garden Court Restaurant in Canberra City. Start time was 07:30hrs with the date usually being the third Tuesday of the month. Apart from the first meeting (when close to 20 members were present), the usual attendance remained steady at approximately 6 members. It is noted that this figure is largely consistent with previous years. On a number of occasions, non-members were invited to attend and participate in specific discussion topics. The Branch's Annual General Meeting will be held at the above venue on 11 September 1998.

ACT Occupational Health and Safety Council - Injury Prevention Awards

4. On 8 July, the ACT Branch Chairperson received a letter from the Chairperson of the ACT Occupational Health and Safety (OH&S) Council inviting the Branch to continue sponsoring the OH&S Council's injury prevention awards. Discussions on this matter had been ongoing within the Branch during 1997/98 and membership was of the opinion that further sponsorship should not be forthcoming unless an ESA member was appointed to the judging panel. The ACT ESA Branch Chairperson wrote to the OH&S Council Chairperson on 31 July informing her of the Branch's position and inviting further communication between ESA and the OH&S Council to explore a way ahead. Unfortunately, no reply was received. As a result, the ACT ESA Branch decided that the Chairperson should write to the relevant ACT Government Minister informing him of the value which an ESA representative would add to the injury prevention award program. This matter is in hand.

Promoting ESA through the Education System
5. The Branch agreed to provide prizes to appropriate students studying an ergonomics relevant course at the Canberra Institute of Technology. The awarding of such prizes was not to be an automatic yearly event but be dependent on the quality of students' work (ie. a student may finish top of the class but if the Branch does not consider his/her work to be of sufficient merit, no prize will be awarded). At this stage, it appears likely that two students will be awarded prizes this year, with the prizes being a book and/or one year's ESA Student Membership. The date of the prize giving day is still to be announced.

Finances

6. A report on Branch Finances will be provided by the Branch Treasurer.

Scientific Program

7. Following a decision by the Branch in 1996/97, the number of scientific meetings was to be significantly reduced during the 1997/98 year. The reason for this decision was to increase focus on the marketing of such events and strive to improve audience numbers. In terms of these performance indicators, the 1997/98 program was successful.

8. The 1997/98 Scientific Program centred on conducting joint meetings with other learned societies. To date, meetings have been conducted with two professional bodies and contact has been established with a third organisation.

9. On 14 May a joint meeting was conducted with the ACT Branch of the Industrial Engineering Society (IES). The venue was Engineering House in Barton. The purpose of the meeting was to establish organisational networks, explore common areas of professional interest and market ESA to a wider audience. The meeting was jointly chaired by the ESA and IES Chairpersons and the formal ESA speakers were Ms Margaret Head and Ms Peta Miller. Approximately 25 people were in attendance and the success of the meeting can be gauged by the fact that a follow-up workshop resulted.

10. On 27 August, a half-day workshop was conducted with the ACT Branches of the Industrial Engineering Society and the Australian Psychological Society (APS). The venue was Engineering House in Barton and the workshop was entitled, 'Mental and Work Overloads'. The workshop was chaired by the ESA Chairperson and the formal ESA speaker was Ms Peta Miller. Approximately 40 to 45 people were in attendance and valuable organisational networks were consolidated/established. One of the major themes to come out of the workshop was the important role which ergonomics can play in addressing issues of overload. The possibility of staging further similar type events are currently being explored.

11. The ESA Chairperson established contact with the Australian Institute of Management (AIM). The purpose was to investigate areas of common professional interest and discuss the viability of holding a joint meeting with AIM. It is expected that this matter will be explored further at an AIM workshop on 22 September.

12. The Institute of Engineers Australia (IEA) was approached by the Branch Chairperson with a view to investigating areas of common professional interest. IEA suggested that, in the first instance, both organisations should exchange
information booklets, leaflets etc. however the ESA Chairperson was informed by the ESA Secretariat that suitable federally endorsed ESA material was not yet available, although some was being produced. Further contact with IEA therefore will be placed on hold for the time being.

13. It is hoped that it will be possible to appoint a dedicated Scientific Program Organiser for the coming year 1998/99.

Marketing

14. Following the face-to-face federal Board meeting in May, the ACT Branch strongly expressed the view that the ESA Marketing Plan be trialed before any federal revision to the Plan be conducted. Consequently, the Chairperson conveyed (in writing) the Branch's concerns to the ESA President (on 13 July) and to both the President and President Elect (on 12 August). The feedback was that issues pertaining to marketing would be discussed at the October face-to-face federal Board meeting (which will include a facilitation workshop to plan future directions of ESA). It is noted that, owing to the Branch Chairperson being pre-booked, the Branch will be represented at this meeting by Ms Kerry Plunkett.

15. The four federally endorsed glossy ergonomics posters have proved to be a successful advertising innovation. These posters were prominently displayed during the recent ESA, IES and APS workshop and helped to inform the audience and promote both ESA and the ergonomics profession. These posters are currently on loan to various members for display in their respective workplaces.

16. As discussed in Paragraph 12 above, a number of federally endorsed information booklets, leaflets etc. would help the marketing of ESA to other organisations. During workshops, conferences etc. such material would ideally complement the posters and present a positive public image of ESA.

Way Ahead

17. The coming years of 1998/99 and beyond will be both exciting and full of challenge. There exists in the Branch a small, but extremely dedicated, core of members who are active in Branch affairs, and one challenge will be to build on this core and attract more members to participate in those affairs. It is unlikely, owing to the relatively small ACT population base, that the ACT Branch will ever be able to match membership numbers attained by, for example, the New South Wales or Victorian Branches. Nevertheless, there are many individuals currently residing in the ACT who are in some way involved in ergonomics yet are not members of the Society. A challenge will be to attract these people to join ESA.

18. It will also be important to take the opportunity to both consolidate and expand the networks established from the joint meetings held during 1997/98. The appointment of a dedicated Scientific Program Organiser will increase the chances of this being achieved.

19. The ACT Branch has discussed, throughout the year, a number of potential marketing initiatives that will contribute to raising the profile of the Society. These initiatives have included the mounting of a display at the Science and Technology Exhibition and the making of a video. It is important however, that, as far as
possible, any initiative specifically contributes to an overall federal marketing thrust based on comprehensive federal policy. It is noted that such matters of policy will be workshopped at the October face-to-face federal Board meeting.

20. In many areas of both the lay community and the longer established professions and sciences (eg. law, medicine, engineering), ergonomics is still often regarded as a somewhat peripheral activity. However, as we press towards and pass into the new millennium, it can be convincingly argued that ergonomics has the potential to play an increasingly important and central role in society. But such a situation will not happen automatically. If we, as an Ergonomics Society, are fragmented and/or unfocused in our activities, then the road will be both long and frustrating and the ultimate result will be a failure to realise full potential. This would be an enormous loss because ergonomics has so much to offer the wider society.

21. Anti-ergonomics (ie. the uninformed design of equipment and processes which, at best, hinders efficient and effective performance and, at worst, injures or kills) is all too prevalent in many areas of life. It is the qualified ergonomist’s function (and indeed duty) to stand against such practice and intervene wherever possible. To this end, the ACT Branch has discussed the viability of targeting specific anti-ergonomic incidents/areas of concern with a view to initiating informed ergonomic interventions. Such initiatives, however, may be of limited value if they are performed on an ad hoc type basis and a challenge for ESA will be to facilitate a comprehensive framework whereby structured and ongoing ergonomic interventions become the norm. One method of attaining such a framework might be to initiate a lobbying program directed at all levels of Government. The specific objective would be to establish a legally binding requirement for ergonomic assessments to be conducted on a whole range of designs and processes as a prerequisite to their being accepted into service. Intrinsic to such a regime would be the requirement to legally regulate those who can practice ergonomics.

22. At the federal level of ESA, much is being done to help ensure that the Society is well placed to meet the coming challenges and to take advantage of the many opportunities which will surely arise as the wider Australian (and global) environment continues on the path of what seems like endless restructuring. New membership criteria has been developed, policy initiatives are evolving and there will be a continuing thrust to raise the profile of both ESA and the ergonomics profession. If it is true to say that ergonomics can make a difference, it is equally true to say that the only way this difference will happen is if we, as ergonomists, make it happen. No one will do it for us.

Conclusion

23. In conclusion, I would like to extend my thanks to the Branch Secretary, Ms Jenny Kerr; the Branch Treasurer, Ms Margaret Kennedy; members of the Committee; the past Chairperson Ms Margaret Head; and last, but not least, the Branch membership, for their support during, what has been, a most interesting, enjoyable and invigorating year.

M.J. McCracken 1997/98 Chairperson ACT Branch
(Mike_McCracken@nmr.defence.gov.au)
New South Wales

Annual General Meeting

A tradition has now been established whereby the NSW Branch AGM is held in an upper room of an interesting ethnic restaurant (this year, Italian). A convivial time was enjoyed by all. The 1998/99 committee is as follows: Chairman: Max Hely Hon Secretary: Rebecca Mitchell Hon Treasurer: Louise Whitby Neil Adams, Christine Aickin, Chris Carassco, Shann Gibbs, David Gosling, Aidrie Long, Marian McLean, Patrick Donohue and Jonathan Talbot (on sabbatical remainder 1998).

"Coming to grips with people" A workshop on the manual handling of humans.

This event, held at The Masonic Centre, Sydney on Monday 14th September 1998 attracted a record number of delegates. The original intent had been to limit the number to 120 but following a flood of applications (some 280) the committee agreed to accept 180, which together with speakers and committee helpers resulted in an attendance of 200 on the day.

The program included plenary sessions in the morning at which Max Hely (NSW Branch Chairman) welcomed delegates and Christine Aickin and Louise Whitby respectively outlined the conceptual and practical issues involved in the manual handling issues associated with client handling. After morning tea, Mike Stevenson spoke about the current status of knowledge in attempting to quantify the risk involved in patient handling; and Jim Delaney addressed the issues involved in handling difficult, aggressive or violent people in a health care setting Ö with implications for all such people interactions.

After lunch, there were three half hour workshop sessions between 1.30pm and 3.30pm; each session comprised 6 groups and thus delegates were offered 3 choices overall. This was the most complicated piece of logistics for the day! Workshop topics included: Bed mobility techniques - Jeanne Kennedy; Handling people in their homes Ann Adams; Patient handling aids / appliances Marcia Lusted; Techniques for dealing with difficult, aggressive or violent people Jim Delaney; Assisted transfer techniques Ev Innes; Hoist selection Christine Aickin; Manutension: Patient transfer techniques Karalyn Murray; Coping with falls: prevention / coping during the fall / getting people up from the floor Kate Tuohy-Main; and Handling the dead Doreen Pawley.

Following afternoon tea, Neil Adams gave an introduction to the legal issues involved for ergonomists involved in forensic cases and explained the format of the ensuing mock common law compensation hearing about a nurse's back injury. Delegates were privileged to have two leading barristers take part while 3 of our members acted as Judge (Mike Stevenson), Expert Witness (Neil Adams) and Nurse (Simonie Kitchen).

This event proved extremely popular and there have been numerous requests to have it repeated. Our thanks are extended to Louise Whitby who was the motivating force behind this event, Monica Amann who provided the organizational management, and the small band of willing committee members who
performed the "back stage tasks" throughout by obtaining speakers and workshop leaders; preparing folders; and being available on the day to man the front desk and smooth any last minute difficulties.

Remainder of 1998 Program

**October 9**, NSW Branch ESA along with Worksafe and WorkCover are sponsoring a Workshop by Barbara Silverstein. There will be two sessions: morning from 10.30 am and afternoon from 1.30 pm respectively: Session 1. *Developing ergonomic regulations in USA*: policy, politics and practicalities; and Session 2. *Tradeoffs in exposure assessment* methods: research and practice. Both sessions will be conducted at the Worksafe Auditorium, Parramatta Road, Camperdown (nr Missenden Road).

**November 4**, Shann Gibbs asks "What is safety? Chaos, fuzziness and the whole damn thing! She proposes a different approach to safety issues that replaces a bivalent, mechanistic analysis and promotes an organic, multivalent awareness of complex issues. Traditionally, risk analysis has relied on an informed gamble with probability statistics is there an alternative for preventative action in the workplace?

**December 2**, Topic to be advised - but the most likely scenario will involve student presentations on their ergonomic and human factors research.

Bush Telegraph

Max Hely has left his position as an ergonomist with WorkCover's BackWatch program and joined the national Safety Council of Australia as Senior Consultant : human factors and ergonomics. Sharonnne Phillips has returned to Worksafe on a contract to research emerging issues in OHS the latest internet guru in our ranks? Marian McLean has left her position as ergonomist at BOC to take up a similar position with Sydney Water. Donna Lee has started work as an ergonomist with Australia Post Jonathan Talbot is on sabbatical at Delft University. Christine Aickin reports that the Style Manual for use of ESA Logo is still in the process of development and the corporate image is being refined by the Consultants Davies and Davies.

Shann Gibbs **NSW Correspondent**

**South Australia**

Annual General Meeting

The SA Branch Annual General Meeting was held in July 1998, followed by an entertaining presentation by Dr Michael Patkin. All present thanked the outgoing committee, with a special acknowledgment given to the enormous contribution made by Lyn Barnett during her time with the committee.

SA Branch - New Committee

The South Australian Branch then welcomed it's newly elected Branch Committee. The elected committee is comprised of people from a diverse range of
backgrounds, bringing with them experiences to enhance activities for the year to come. The newly elected SA Branch committee members are:

Tim Upsdell, Chairperson / Federal Council
Nikki Fergin, Secretary / Publicity
Caroline Dingle, Treasurer
Marion Pocock, Committee Member
Anne-Marie Murray, Committee Member
Susan Ellis, Committee Member
Nick Doncaster, Committee Member
Lisa Clingelffer, Committee Member
Mandy McEllroy will continue to provide committee and secretariat support which is appreciated.

At their first meeting the committee held a planning session. The focus this year will be on marketing with the aim of increasing membership and the profile of the Branch.

New Members

The SA Branch extends a warm welcome to our newest members. Nick Doncaster, Rehabilitation Consultant with Pe Poi Consultancy Services and Lisa Clingelffer, Occupational Therapist with Nandu Nandoskar & Associates.

Promotional Activities

The SA Branch is working to design a permanent display to be located in the OHS Collaborative Centre being set up jointly by the major state universities. The display will present a range of ergonomic equipment, information and provide an opportunity for visitors to gain a better understanding of the field and application of ergonomics.

Education Program 1998

The first half of the Education Program for 1998 has provided members an excellent range of guest speakers who presented on topics which explored the application of ergonomics in a variety of disciplines. The sessions have continued to strengthen ESA networking, broaden the knowledge of members and others, and providing an opportunity to prompt discussion and debate.

'Application of ergonomic principles within South Australian companies'

Janet Sawyer, Lecturer at the University of South Australia Whyalla Campus presented findings of two research studies undertaken to determine the knowledge of ergonomic principles in relation to the use of desktop computers. Overall the findings of the research suggests managers and computer operators require more information and training to increase their knowledge of ergonomics and the use of computers.

'Using head mounted video cameras to facilitate task analysis.'

In June the ESA welcomed guest speaker Maya Drobnjak from the DSTO. Maya spoke to members and others interested in the use of head mounted video cameras to facilitate task analysis.

'Application of ergonomics in surgery.'
Michael Patkin, Surgeon presented an enlightening look at the application of ergonomics in surgery during July, in conjunction with the Annual General Meeting. Dr Patkin, sprinkling the session with humour and colourful analogies, covered various aspects of surgery including microscopic surgery, layout of hospital operating rooms, aspects of surgical dexterity as well as providing the group with a glimpse at his personal attempt at designing ergonomically sound surgical equipment.

'Fatigue Management'

Drew Dawson provided a detailed look at a recent study conducted by the Sleep Research Centre which made an effort to link the affects of alcohol and the affects of fatigue. The study involved two groups, one given two drinks per hour until they reached a 0.10 blood alcohol level and the second group were kept awake for 26 hours, the equivalent of a person on their first night shift. Each group was tested at regular intervals using several assessment tools measuring hand-eye coordination, vigilance and grammatical reasoning. More detail is available from the following internet site: http://www.unisa.edu.au/sleep

Victoria


Forthcoming Branch events and meetings this year:

WE'VE decided to postpone our half-day Branch Professional Development Seminar "The Ergonomics Practitioner for 1999" from Thursday September 10 until November 10, one month after the Federal Conference.

Victorian Committee members have been flat out preparing for our hosting of the October ESA Conference in Melbourne. Unforeseen absences by key players, a burnt-out car and some significant hangovers further delayed necessary planning work on this seminar. We thought it best to postpone it rather than risk running anything less than a really great event. We hope you're not inconvenienced by this change; we do promise, however, a sensational session in November to finish off this year's Scientific Program.

Last meeting (July) - report

On Wednesday July 8 35 members met at 6:00 pm at the world-famous Safety Centre at the Royal Children's Hospital, Flemington Rd Parkville. After hot savouries, chilled and warming wines and soft drinks, we were taken through an excellent program planned around the theme - "Ergonomics in the Home". We had a tour of the Centre (with its interesting examples of domestic and child safety-related ergonomic applications), and several presentations, including words of practical wisdom from branch members Jan Dods and Mark Hennessy. We had hoped also to have the world premiere of a just-released video "Safety in the Home" produced by the City of Hume - regrettably, a VCR fault meant that this will be postponed to a future meeting. Anyway, we finished up in a state of invigorated enthusiasm at about 8:45 pm. Thanks to David Trembearth for his careful planning of an outstanding evening.
Notice - ESA Conference 1999 Call for Workshops Call for Poster Papers

The ESA is pleased to announce that the Association's National Conference in 1999 will be held in Fremantle, near Perth, WA. between 11th and 13th October.

The Conference theme is "Better Skills - Better Future." There will be keynote addresses from leading national and international speakers.

The main focus of this unique conference will be a series of workshops. The aim is to provide all participants with the opportunity to improve their practical ergonomics skills applicable in a wide range of workplace assessments and interventions. Therefore, there will be a highly participative approach to professional development.

The workshop topics will represent the broad range of interest of most ergonomists. They may be broadly described as addressing one or other of the following issues: Physical, Psychological/ Cognitive, Environmental, Organisational, and Professional Development. Presentations of major poster sessions will illustrate the latest knowledge and experience. Conference participants will also have access to international scientific papers via the CybErg 1999 Conference on the Internet.

The Conference Committee is pleased to invite your suggestions or participation in designing this conference to match your needs as closely as possible.

Would you please complete the following by 30th November, 1998 (at the latest) and return to the conference secretariat - Anne Nicolay, Keynote Conferences PO Box 1126 West Leederville, WA. 6901. email: keynote@ca.net.com.au

Name:_____________________
Address:___________________________________
Contact Phone no:______________

I would be interested in presenting a workshop on________________________________________
I would find it interesting to attend workshop(s) on the following topic(s)
________________________________________

I would like to give a poster presentation on________________________________________
I would like to receive registration information when it is available: Yes/No

Other comment:____________________________________

CybErg 1999
Dear Colleagues,

Travel to your next international ergonomics conference free!

CybErg 1999, the second international cyberspace conference on ergonomics, follows the highly successful CybErg 1996. Over 1,000 ergonomists from 34 countries participated in CybErg 1996. CybErg 1999 promises to be even bigger and better.

For further details visit the website:

http://www.curtin.edu.au/conference/cyberg/

Please pass on these details to other colleagues who may be interested.

Looking forward to your participation in CybErg 1999.

Dr Leon Straker General Chair, CybErg Conference.

Conference Secretariat: Congress West Pty Ltd PO Box 1248 West Perth WA 6872 Australia
Ph:+61 8 9322 6906 Fax: +61 8 9322 1734 Email: conwes@congresswest.com.au

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A Heavy Engineering Design Checklist

Skepper, N., Straker, L. and Pollock, C.

Background

This checklist (available from http://www.uq.edu.au/eaol/oct98/checklist.html) was developed as a guidance tool to assess operational engineering designs in the oil and gas industry. It was developed as part of a research project on the use of ergonomics in the engineering design process. Details of the project are being reported elsewhere (Skepper, Straker and Pollock 1998; Skepper, Straker and Pollock, in preparation).

The literature was reviewed extensively to identify potentially suitable checklists. Whilst many checklists were identified (for example: Ergoweb, 1997; International Labour Council, 1996; Workplace Health and Safety, 1996; DOHSHA, 1995; Howarth, 1995; DOHSHA, 1994; Straker, 1994; Dul and Weerdmeester, 1993; Sanders and McCormick, 1993; Ostrom, Gilbert and Hill, 1992; Pulat, 1992; Woodson, Tillman and Tillman, 1992; McClelland, 1990b; Meister, 1990; Stammers, Carey and Astley, 1990; Drury, Paramore, Van Cott, Grey and Corlett, 1987; Grandjean, 1985; Frederick, Habes and Sloemer, 1984; Eastman Kodak, 1983; Productivity Promotion Council, 1979) none were suitable for this research project.

Therefore a new checklist was developed. Relevant topics were chosen from the checklists in the literature and combined into 7 major headings including general, work environment, equipment, work practices, physical and psychological task
demands, organisational issues and employee characteristics. The safety issues not included are listed at the end to clarify their intentional exclusion from this checklist.

The topics were organised so that an engineering design could be evaluated in a short period of time. Space was allowed for comments next to each point and possible responses included yes, no or not applicable, choice being indicated with a tick under the relevant response. A "no" response was designed to indicate situations which may be associated with higher risk of injury or illness or which may be contributing to ergonomic risk.

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**A Review of the Ergonomics Modelling Software Package MQPro**

Peter Blanchonette and Robert King

Air Operations Division Aeronautical and Maritime Research Laboratory

**MQPro (version 7.0)**

ManneQuinPro (formerly known as MANNEQUIN) was developed by HumanCAD Systems, a division of Biomechanics Corporation of America, to assist ergonomists with workplace design and assessment. MQPro allows the ergonomist to build a graphical model of a worker 'mannequin' and the workplace, and assess the posture, reach and view of the worker. An animation function is available, so the ergonomist can also assess the movement of a worker in the workplace. A demonstration version of MQPro can be downloaded from [http://www.mqpro.com](http://www.mqpro.com).

**Price and Computing Requirements**

MQPro is much cheaper than other ergonomic software packages currently available, including JACK and Ergo (MQPro currently retails for US$999 - late last year we were quoted over US$30,000 for JACK and over US$100,000 for Ergo). MQPro is the only software of its type that runs on a personal computer, with others requiring either an expensive mainframe or Unix workstation. Hardware requirements for MQPro are as follows: 486 or higher with at least 4 megabytes of memory and 8 megabytes of available disk space. Microsoft windows 3.1, 95 or NT is also required.

Usability MQPro is extremely user friendly. The user interacts with MQPro via pulldown menus and tool bars. The user can also directly manipulate the on-screen graphical models by 'selecting, clicking and dragging' with the PC mouse. A searchable on-line help is provided and faithfully reflects the contents of the user manuals. HumanCAD provide a number of example models to give the user a feel for MQPro's design and assessment capabilities, including a cockpit with two pilots, an operating theatre and a motor vehicle with passengers.
Building Models MQPro supplies eleven anthropometric databases to aid the user in designing the worker mannequin, including several civilian populations, the US Army 1988 database and the NASA-STD-3000 database. Once the appropriate database has been selected the user has to make several further design choices for the mannequin model including gender, size (2.5%, 5%, 50%, 95% and 97.5% percentiles), somatype (heavy, average and thin) and figure representation (human, robot, skeleton, humanoid and stick figure). It is also possible to create a composite mannequin with, for example, the upper body of man at the 95th percentile and a lower body at the 5th percentile. Children, ages 3 through 12, can also be modelled.

Once the mannequin's characteristics have been chosen the mannequin's posture can be modelled. Twenty-nine common postures and four physically-challenged
postures are available via menu selection. If the exact posture is not available, it is easy for the user to pose the mannequin limb by limb (including fingers) by manipulating the graphical mannequin model. Postures developed by the user can also be saved for future use. The movement of each joint is restricted within realistic joint constraints (this feature can also be switched off). There are several different types of graphical representation available for the mannequin model, including wire mesh, frame, hidden line and two shaded representations. We have found that hidden line is generally the clearest representation for our purposes.

Simple workplaces can be created via the drawing tools available in MQPro, although complex, scale-critical designs are better handled by packages such as AutoCAD. MQPro does make the importation of dxf (common graphical drawing exchange format) files easy. We have had no trouble importing AUTOCAD drawings of complex cockpits and crew workstations into MQPro.

Assessment Tools Once the mannequin(s) and workplace models have been created, the user can view the scene from any perspective. The mannequin's reach (with hands and feet) and field of view can be assessed. An animation function is available, so the movement of a worker through the workplace, or at a workstation can be assessed. For postural analysis, MQPro will report relative body angles.

MQPro also has a biomechanics module. For manual handling tasks, the recommended weight that can be lifted by a mannequin model can be calculated using the (inbuilt) 1991 National Institute of Occupational Safety and Health equations. In terms of more complex biomechanical analysis, the user can enter the initial and final postures of the mannequin, the type of coupling, the amount of weight lifted and the frequency of lifting. Once external loads have been placed on the mannequin the user can view and print reports on the forces and moments acting at the joints and the effect of these forces. However, we would point out that very limited information is provided about the biomechanics model, and no information is provided in relation to the validation of the model. Thus, we could not recommend using the biomechanical model in the present version of MQPro for these more complex analyses. HumanCAD are currently improving and validating the biomechanical model (Jarviven, personal communication).

Conclusion Compared to the other software currently available in this field MQPro by HUMANCAD offers very good value for money, and puts the capability to design and/or assess a workplace within the reach of every ergonomist. MQPro is user friendly and allows the user to build workplace models with relative ease. MQPro allows the user to assess the posture (in terms of relative body angles), reach and view of the worker in the modelled workplace. The movement of a worker through the workplace or at a workstation can also be assessed. We suspect the biomechanics module is "immature" and could not recommend its use at this stage. Nevertheless, we believe the package is worth the asking price. HumanCAD appear to want to keep their customers happy and any questions emailed to them were generally answered promptly.

References: Jarvinen, J. Director, Ergonomics Research & Development, HumanCAD Systems
Using the 3-Dimensional Static Strength Prediction Program, Version 4.0 in the Study of a Patient Lifting Task.

Mike Stevenson
Balgowlah, NSW (Mike_Stevenson@bigpond.com.au)

A file containing this article in WORD is available

AIMS

This note has two aims: first to review the recently released Version 4.0 of the 3-Dimensional Static Strength Prediction Program (3DSSPP) from the University of Michigan, and second to apply it to a patient lifting task. This is not intended to be a thorough study of alternatives for the lifting task considered, but the task provides a good example of the problems in a 3D analysis.

THE PROGRAM

The earlier versions of the 3DSSPP have been much less widely used than the two-dimensional (2D) versions, mainly because of the perceived complexity of data input. In the original program, 15 joint angles needed to be entered to define the posture, compared to 5 angles for a 2D model. In Version 2.0, an "inverse kinematics" method was introduced in which the program computed a starting point for the posture on the basis of defined positions of each hand. The joints could then be manipulated using the mouse until an oblique view of the posture corresponded as closely as possible to a photograph of the actual posture. For this purpose, the oblique view could be adjusted to approximate the view point used for the photograph. Version 4.0 has been designed for Windows 95 or Windows NT and is much easier to run under those systems, particularly for printing on Windows printers or for copying screens onto a word processor. Presumably, it would run just as well on Windows 98. New features include the following:

The same program may be used for 2D analysis. The main layout consists of five separate windows, which may be independently adjusted for size. Thus, a window may be enlarged for easier adjustment of the posture figure which it displays. The graphics are improved so that manipulation of the figures with the mouse is easier. Reports and data entry windows are simplified and more clear.

While the program is easier to use than its predecessors, it still takes some practice, and can be frustrating, eg. when one attempts a small postural change by slightly moving one joint, only to have a major change in the whole posture result because of some posture rules built in to the program. This problem can be reduced by "locking" the posture of the legs or of the legs and trunk.

Three of the windows are orthogonal views, viz. Top, Front, and Side views. The other two windows of the main screen show an oblique view and some basic results. In the oblique view, the following objects may be displayed in addition to the human: the floor, a seat, the hand-held object (if a simple shape), a wall and a table. While the manipulation of these objects in the display has no bearing on the analysis, it could help in the communication of the problem to others. I found the
positioning of a table in this view to be rather confusing, but it can be varied quickly by trial and error.

APPLICATION OF THE PROGRAM

To use and interpret any computer models of this type, it is vital to have some understanding of the biomechanics on which they are based. It is also vital to understand the limitations of the biomechanical analysis. For example, postures, body segment masses and population strengths are based on limited empirical data. Also, factors apart from biomechanics must also be considered in the risk assessment of any manual handling task.

While the 3DSSPP is a more realistic representation than the 2D model, it still has its limits in analyzing complex tasks such as patient lifting. It obviously allows postures which are not symmetrical about the sagittal plane. It also allows each hand to have a different load on it. However, it only provides for external loads to be applied through the hands, whereas loads may actually be applied to the shoulders, knees, elbows, etc. In cases where loads are partly lifted by the shoulder, this limitation can be overcome by calculating a load at the hands which is equivalent to the shoulder load as far as the effect on the low back force is concerned. Also, an indication by the model that a certain set of input data violates balance requirements may be ignored if it is known that balance is achieved in the real situation by a reaction force against the body from some fixed object in the environment.

As its title clearly indicates, the 3DSSPP is a static model and dynamic inertia effects are ignored. This should not limit its application unduly because smooth rather than jerky lifting motions are generally advocated. However, some patient lifts may only be achieved through a dynamic effect in order to maintain balance. The loads input to the model could be increased to allow for such dynamic lifts, but the accelerations would need to be measured. On the other hand, the data on strength capabilities at the joints, and the upper limits on low back strength are based on gradually applied loads and are strictly relevant only to gradual lifting situations. Interpretation of results obviously calls for some judgement on these issues.

In the 3DSSPP model, the posture may be defined by inputting 15 defining angles of the limbs. However, these angles can only be measured if 3 orthogonal photographs of the lifting task, which have been taken simultaneously, are available (for a 2D model, all 5 angles are measured from one side view). Three orthogonal views may also be developed using body templates or computer models such as Ergoshape, but this is not easy. The alternative is to use the "inverse kinematics" method. For this, the positions of the hands relative to a datum set of axes are defined, and this results in a predicted posture which can then be manipulated with the mouse to match an oblique photograph. The definition of the axes is a little difficult. The origin is the mid-point of a line joining the ankles, but the direction of the axes emanating from the origin depends on the angle that this line makes with the viewing directions in the three orthogonal views. Since this model allows the ankles to be spread independently in the fore and aft direction, the line joining them is not necessarily orthogonal to the views.
AN EXAMPLE FROM PATIENT LIFTING

The example chosen is a comparison of three lifts for moving a patient up the bed, viz. the "Orthodox", the 'Shoulder' and the "Modified Shoulder" lifts. The Orthodox lift, shown in Figure 1, is now condemned in The Guide to the Handling of Patients (Corlett et al. 1992). The Shoulder lift (sometimes referred to as the "Australian" lift) is illustrated in Figure 2. A vital characteristic of this lift is that the lifters use their forward arms as props to take their upper body weights and some of the weight of the patient. The patient weight is supported mainly through the shoulders of the lifters but also by their backward arms which are passed under the thighs of the patient so that each lifter grips the hand of the other. The Orthodox lift can reasonably be approximated by the 2D model, but the Shoulder lift involves completely different forces on each hand, one being downwards and the other upwards, so this cannot even be approximated by the 2D model.

Figure 1. Orthodox lift (from Corlett et al. 1992)

Figure 2. Shoulder lift
Figure 2. Shoulder lift (from Australian Standard 2569, Part 1-1982: Safe manual lifting and moving of patients).

The Guide to the Handling of Patients (Corlett et al. 1992) advocates a Modified Shoulder lift in which each lifter places one knee on the bed in order to get closer to the patient, as shown in Figure 3. The Guide describes this lift as follows: "The patient is assisted to a sitting position, and while one nurse supports him, the other can adjust the pillows etc. From behind the patient, the nurses press their near shoulders into the patient's chest wall under his axilla, while the patient rests his arms on their backs. The nurses' near arms are then passed under the patient's thighs as close to the buttocks as possible. Each nurse then grips the other using a Wrist or Finger grip. The nurses' other hands are placed on the bed behind the patient to relieve stress on the nurses' trunks". (See The Guide for more a more extensive description.)

Figure 3. Modified Shoulder lift (from Corlett et al. 1992)

The 3DSSPP, Version 4.0 was used to compare the compression force on L5/S1 for each of the three types of lift. In all cases, both the lifters and the patient were assumed to be 50th percentile females, each with a mass of 64 kg. The line drawings in Figures 1, 2 and 3, which were based on photographs, were used to help develop postures. The bed was assumed to be 860 mm wide and adjustable in height. Other assumptions used to determine inputs are described for each case.

**The Orthodox Lift** The 2D mode of the 3DSSPP was used to analyze this lift. This mode assumes equal loads on both hands and that all the load is taken by the hands. In fact, a lot of the load would be taken through the forward shoulder. It
was assumed that each lifter's share of the load was distributed so that two thirds passed through the forward shoulder and one third through the backward arm. Using the distances from L5/S1 of the shoulder joint and the hands in the developed posture, a load on the forward hand which was equivalent to the shoulder load was calculated. This was added to the load on the backward hand to give the total load to be shared by the hands. The result of this analysis is shown in Figure 4 which reproduces the 3DSSPP main screen. While this screen indicates that the balance is unacceptable, in reality a balancing force is provided by the bed against which the lifters' knees are pressed. The numbers against each joint in the Results Status window indicate the calculated percentage of the population which is capable of the strength required.

**Figure 4. 3DSSPP main screen for Orthodox lift.**

**The Shoulder Lift** Typical hand positions for a Shoulder lift were measured using real subjects, and these positions relative to the feet were used in the reverse kinematics method. Considerable modification of the posture using the mouse was then required to get the oblique view close to the actual posture.

A typical upward force provided by the supporting arm was estimated by simulating the lift with a real lifter, and superimposing bathroom scales between the supporting hand and the bed. This force was approximately 15 kg, so a conservative value of 12 kg (120 N) was used. No means were available for measuring the force on the shoulder and the backward arm, so it was assumed that the patient weight was equally shared by the lifters, and two thirds of the share was taken through the shoulder and one third through the backward arm. While different force magnitudes and directions could be input for each hand, the program only allows for loads to be applied through the hands, not the shoulder. A force on the backward hand was therefore calculated which would give a moment on L5/S1 equivalent to the moment which would be produced by the actual load on the shoulder. The force on the backward hand was considered to be mainly downward but also slightly backward as a reaction to the forward motion of the patient. Likewise, the force on the supporting arm was considered to be mainly
upward, but also slightly backward to assist the stability of the lifter. Three possible hand orientations; prone, semiprone and supine may be selected, but whichever orientation is chosen is applied to both hands. The semiprone orientation was therefore used for this application. The result of the 3D analysis is shown in Figure 5.

![3DSSPP main screen for Shoulder lift.](image)

Figure 5. 3DSSPP main screen for Shoulder lift.

**The Modified Shoulder Lift** Typical hand positions for the Modified Shoulder lift were estimated from a one tenth scale plan view of the lift, developed using an IWA body template (Robert Bosch 1978) for an average size woman, for both the patient and the lifters. The forces on the hands were estimated as for the Shoulder lift. The result of these inputs, and manipulation of the posture to be reasonably close to the posture in Figure 3, is shown in Figure 6.

Compression Forces Figures 4, 5 and 6 include calculated values of the compression force on the L5/S1 disc based on a simple model using the contraction forces from the erector Spinae and Rectus Abdominus muscles. However, asymmetric lifts involve recruitment of additional torso muscles which must add to the compression force. The 3DSSPP also gives a "3D Lowback Analysis" force which takes the additional muscle forces into account and is recommended for asymmetric loading. These two compression force values are summarized in Table 1.

**Table 1. Calculated Values of Compression Force on L5/S1 (N)**

<table>
<thead>
<tr>
<th>Lift Type</th>
<th>Simple Model</th>
<th>Asymmetric Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orthodox</td>
<td>4366</td>
<td>4312</td>
</tr>
<tr>
<td>Shoulder</td>
<td>1706</td>
<td>2306</td>
</tr>
<tr>
<td>Modified Shoulder</td>
<td>1002</td>
<td>2118</td>
</tr>
</tbody>
</table>
OTHER STUDIES OF THIS TASK

An investigation of back stresses in the Orthodox and Shoulder lifts using the intra-abdominal pressure sensitive pill developed by Davis and Stubbs at Surrey University was reported by Bradbeer (1983). Male nurse subjects were used in lifting a 65 kg patient. It was found that the peak intra-abdominal pressure during the Orthodox lift was 120 mm Hg pressure, while the comparable value with the Shoulder lift was 54 mm Hg pressure. Davis and Stubbs had established a critical pressure level of 100 mm Hg pressure for males, above which the incidence of back pain was significantly increased. Their "Force Limits in Manual Work" (Materials Handling Research Unit 1980) was based on a maximum of 90 mm Hg pressure, and again this data applied only to males.

Stubbs et al. (1983) applied the pressure pill technique with eight female student nurse subjects to a comparison of four methods for lifting patients up the bed, including the Orthodox and Shoulder lifts. In all cases the patient was a female of 53 kg mass. Variability of the results was quite high, and after 40 lifts with each method, the mean pressure obtained for the Orthodox lift was 30.0 mm Hg (S.D. 10.8), while the mean for the Shoulder lift was 19.6 mm Hg (S.D. 9.4). These values may be compared with a safe limit of 45 mm Hg for females, established by David (1985). Pheasant et al. (1991) used these results, and assuming that the intra-abdominal pressure increased linearly with patient weight, calculated that when lifting the normal range of patients the Orthodox lift would give a 60% risk of exceeding the safe level of 45 mm Hg, while the Shoulder lift, although much better, would still give a 20% risk.

Winkelmolen et al. (1994) used a two-dimensional biomechanical analysis to compare lifting techniques including the Orthodox and the "Australian" lift. Unfortunately, they have misinterpreted the "Australian" lift, neglecting the use of the forward arm for support. Nevertheless, they found the "Australian" lift to give the lowest L5/S1 compression force, and only a moderate level of perceived exertion.
DISCUSSION

The magnitude of the compression force on L5/S1 is considered to be a strong indicator of the risk of back injury in a biomechanical analysis, and NIOSH (1981) gives values of 3400 N for an Action Limit (AL), and 6400 N for a Maximum Permissible Limit (MPL). The asymmetric model values in Table 1 should be more representative of the real 3D situation and should be compared with the NIOSH limits.

In the Orthodox lift the compression force of 4312 N substantially exceeds the AL. The MPL could be closely approached with heavier patients. Both types of shoulder lift give compression values well under the AL showing they would be much safer as far as back injury is concerned. Of these two lifts, the Modified Shoulder lift gave the lower compression force. The compression force for the Orthodox lift was 1.87 times that for the Shoulder lift. For comparison, the experimental results reported by Bradbeer (1983) showed that the intra-abdominal pressure with the Orthodox lift was 2.2 times greater than with the Shoulder lift. The results of Stubbs et al. (1983) gave a pressure 1.53 times greater. This is quite good agreement considering the different weights of the patients and the inevitable differences in postures used.

Other results in the analysis need to be interpreted with care. The analysis for the Shoulder lift shows 3% capable for the torque on the elbow and 11% for the shoulder. The additional reports indicate that these low percentages apply to the backward shoulder and the forward elbow. As far as the backward shoulder is concerned, it must be recalled that the direct load on the shoulder was converted to an equivalent load on the hand in order to overcome a limitation of the program. The model therefore indicates a much higher torque on the backward shoulder than would actually occur, so it does not provide a correct estimate of percent capable at this joint. When a closer approximation to the actual load was applied to the backward hand, the analysis showed 75% capable.

As far as the forward elbow is concerned, the strength capability is based on extension strength which is about one half of flexion strength. This suggests that the forward elbow joint should not be expected to extend in order to help with the lift, but should be locked in the fully extended position in order to transfer weight through to the bed. The analysis of the Modified Shoulder lift also shows 0% capable at the knee joint. The additional report shows that it is the kneeling knee which is referred to. Unfortunately the model assumes that this knee is involved in the lifting, and since it is flexed to its maximum, its strength capability is very low.

The main purpose of this application has been to calculate loads on the low back. In a study of the sensitivity of the model, slight variations of posture and positions of the hands and feet in the case of the Shoulder and Modified Shoulder lifts all resulted in similarly low values of L5/S1 compression. There is no doubt that the shoulder lifts are superior to the Orthodox lift in this respect, mainly thanks to the support from the forward arm. However, as Pheasant et al. (1991) have shown, there is still significant risk with the Shoulder lift. Corlett et al.(1992) recommend the use of slings or a draw sheet under the patient, with the lifters getting close by putting one knee on the bed, and adjusting the bed height to minimize bending.
FINAL COMMENTS ON THE 3DSSPP

Obviously the 3DSSPP can model many manual handling tasks more realistically than 2D models. Version 4.0 of this program, being easier to use than earlier versions, makes a 3D analysis more feasible. However, the program takes some practice and input is still tricky. The manual supplied with the program is quite good, but it could be improved by working through a number of typical examples. Ideally, one should attend a short course on the use of the program.

The basic cost of the 3DSSPP Version 4.0 is US$1195 plus US$30 for shipping, but if you have the previous version, the upgrade costs US$195 plus US$30 for shipping. I had to pay a further A$32 duty when the upgrade package arrived. Further details are available from Linda Hamlin at the University of Michigan Software, email: linda_hamlin@mail.tmo.umich.edu, or consult the University's Center for Ergonomics web site: http://www.engin.umich.edu/dept/ioe/C4E/.

REFERENCES


Materials Handling Research Unit, University of Surrey, 1980, Force Limits in Manual Work. IPC Science and Technology Press, Guildford, Surrey, UK.


Electronic Resources

Ergonomics in space
The NASA-STD-3000 Man-Systems Integration Standards (including video clips) are available at [www-sa.jsc.nasa.gov/MSIS_online.html](http://www-sa.jsc.nasa.gov/MSIS_online.html) Our email is msis@ems.jsc.nasa.gov (from Ergonomics International)

**ERGONOZ** is a list to enable the networked ergonomics community in Australia to network. ERGONOZ was first discussed at the ESA annual conference in December 1994. At that time it became apparent that the Internet was starting to touch (entwine, entrap?) a wider range of the Australian ergonomics community, and that it could provide a way of keeping in touch between annual conferences. The list is open to both members and non-members of the Ergonomics Society of Australia, but if you are sufficiently interested to subscribe to the list, please consider joining the society.

A word about lists.

Each list has two addresses.

The first is the administration address, listserv@latrobe.edu.au.

To subscribe, send an email to listserv@latrobe.edu.au with the message:

```plaintext
subscribe ergonoz
end
```

To unsubscribe, send:

```plaintext
signoff ergonoz
end
```

As well as "subscribe" and "signoff" commands, if you send the "help" command you'll find what else listserv can do for you. I strongly recommend that you do so.

The second address is that of the list itself, in this case ergonoz@latrobe.edu.au. All mail sent to this address will be sent to all members. Please do not send list commands to this address. If you are confused or get into strife please contact me (Owen Evans) directly at o.evans@latrobe.edu.au.

**UK Defence Standards** are available in Electronic Form (pdf) from [http://www.dstan.mod.uk/](http://www.dstan.mod.uk/)

Standards available include: 00-25 Human factors for designers of equipment Parts: 1-13, titles include: Body size, Body strength and stamina, Workplace design, Stresses and hazards, Visual displays, Human Computer Interaction

The first issue of **Internetworking** (the newsletter of the ITG) is now on the website at [http://www.sandia.gov/itg/newsletter/june98/contents.html](http://www.sandia.gov/itg/newsletter/june98/contents.html)

articles include:
The Makings of a Technical Group... Chris Forsythe

Creating Web Site Designs Based on User Expectations and Feedback ... Jeanette Fuccella and Jack Pizzolato

The Log Annotation Device (LAD): A World Wide Web Storage and Retrieval Tool ... Robert C. Allen, Hector Morelos-Borja, and Kay Stanney

Web Site User Centered Design: Techniques for Gathering Requirements and Tasks ... Jeanette Fuccella, Jack Pizzolato, and Jack Franks

The Victorian Workcover Ergonomics Unit is now on-line.

Addresses of Unit members:

- Ros Kushinsky ros_kushinsky@workcover.vic.gov.au
- Fiona Begg fiona_begg@workcover.vic.gov.au
- Alan Duffett alan_duffett@workcover.vic.gov.au
- Bich Huynh bich_huynh@workcover.vic.gov.au
- Paul Cockayne paul_cockayne@workcover.vic.gov.au
- Ross Armstrong ross_armstrong@workcover.vic.gov.au

Please feel free to contact the Unit. tel 03 96288250 fax 03 96288377 c/- World Trade Centre, PO Box 414 Melbourne 3005

From: "Blanchonette, Peter" <Peter.Blanchonette@dsto.defence.gov.au>

This URL may be of interest to Erg Australia readers. It has links to various human modelling packages, as well as other sites of interest to ergonomists.

http://www.sae.org/TECHCMTE/g13links.htm

ESA member Alex Ivanow maintains a well organised directory of OH&S products and services at http://www.ohs.com.au

Conference Calender

1998


1999
• May 9-12, 3rd National Conference on Injury Prevention and Control, Brisbane, Secretariat: IPC 99 C/ Intermedia PO Box 1280 Milton Qld 4064 Tel: 07 3369 0477 Fax: 07 3369 1512 Email: ipc99@im.com.au; http://www.nisu.flinders.edu.au/aipn/3ncipc/
• May 12-15, 9th European Congress on Work and Organizational Psychology, Espoo-Helsinki, FINLAND. Contact Sanna-Leena Savola, FIOH, Topeliuksenkatu 41 a A, FIN-00250, sasa@occuphealth.fi
• May 19-21 4th Int. Computer-Aided Ergonomics and Safety Conference, Barcelona SPAIN. Contact Markku Leppanen, PO Box 541, FIN-33101 Tampere FINLAND; mleppane@cc.tut.fi; http://www.caes99.org
• June 6-9 14th annual Int. Occupational Ergonomics and Safety conference, Orlando, FL, USA. Contact Prof. Gene Lee, Dept. of Ind. Engineering, Univ. of Central Florida, Orlando, FL 32816; GLEE@mail.ucf.edu
• June 16-19 European Conference on Transport Psychology, Angers, FRANCE. Contact Secretariat AEPSAT, BP808, Place Andre Leroy 49008 Angers Cedex 01 FRANCE; europsyt@uco.fr; http://www.inrets.fr
• August 8-13. International Society of Biomechanics Congress, Calgary, Canada. Contact: Ph. +1 403 220 6229, Fax +1 403 284 4184, email: mastroh@acs.ucalgary.ca, http://www.kin.ucalgary.ca/isb99
• September 15-17, European Symposium on Safety in the Modern Society Helsinki FINLAND. Contact Ms Kristiina Kulha, FIOH, Topeliuksenkatu 41 a A, FIN-00250, Helsinki FINLAND; Kristiina.Kulha@occuphealth.fi

2000

• IEA 2000 29 July-4 August 2000 in San Diego, California, USA. Contact IEA/HFES 2000, HFES, PO Box 1369, Santa Monica, CA 90406-1369, USA; Email: HFES@compuserve.com
• 27 August - 1 September 26th ICOH International Conference, Singapore. Contact Secretaria ICOH2000, c/o Dept of Community, Occupational and Family medicine Faculty of Medicine MD3, Lower Kent Ridge Road, Singapore 119260.

Information to contributors

The preferable form of submission is via email, either in the body of a message, or as an attachment. Files may also be mailed on floppy, (or Zip disc if very large). Virtually any format of files can be accommodated.

Intending contributors are invited to contact the editor to discuss potential submissions.

All enquiries or feedback should be addressed to the editor, Robin Burgess-Limerick PhD.

Email: robin@hms.uq.edu.au