Numerous studies have shown that many workplaces have a high number of workers suffering from musculoskeletal disorders (MSDs). This situation is an important cause of disability and generates enormous human and economic costs.

One can quickly understand why the public health sector in Québec is interested in developing tools to reduce work-related musculoskeletal disorders (WRMDs). Hence, adopting modified work measures is a way to reduce work absences, prevent prolonged disability and to make workplaces aware of the risks of MSDs, thus promoting MSD prevention.

Tools for Modified Work (TMW) Project: Background

The “Workready” research project conducted in Québec, Ontario, and Manitoba, which was funded by the Health Evidence Application and Linkage Network (HEALNet), enabled researchers to gain a better understanding of the factors impeding or facilitating the return to work for workers with MSDs. In Québec, the project studied case management measures that were taken for employees with MSDs in 10 electric and electronic companies as well as the obstacles and the factors facilitating temporary assignments and the return to work for these workers.

The main results of the “Workready” research in Québec emphasized the complexity of implementing return to work (RTW) activities, the large number of stakeholders involved in the RTW process, the communication problems between company managers and treating physicians, as well as organizational factors influencing collaboration between managers and workers with MSDs regarding the RTW procedures. The study specifically identified the conflicting roles experienced by supervisors regarding their RTW responsibilities and their production objectives as well as the workers’ better collaboration when the physical work demands were matched to their physical capacities (Baril et al 2003, Stock et al 1999).

Based on the conclusions of the “Workready” research project, a multidisciplinary team worked on developing intervention tools as well as writing a guide to help companies implement a structured modified work program for workers with MSDs. A preliminary document of the guide and tools was written and tested in three companies over a two-year period in order to evaluate the implementation rate of the proposed approach as well as assess the user-friendliness of the tools and identify factors facilitating the implementation and the limitations. Theses tests were then used to review the guide and tools and to publish a final document.

The final document called “Work-related Musculoskeletal Disorders: Guide and Tools for Modified Work”, was published in January 2005. The guide was produced by the Direction de santé publique de Montréal in collaboration with the Institut national de santé publique du Québec, the Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSSST), professionals from the Association paritaire pour la santé et la sécurité du travail – Secteur fabrication de produits en métal et de produits électriques and the Commission de la santé et de la sécurité du travail (CSST), and also with the financial support from HEALNet and the IRSST.

Presentation of the Guide

The guide totals some 60 pages or so and includes the following: a six-step approach aimed at setting up a successful modified work program; an algorithm showing the steps to facilitate the follow-up of workers returning to work; and three series of decision-aid tools to facilitate the implementation of modified work tasks. The guide is intended for anyone wishing to implement such a
Be a part of YOUR newsletter!
Please direct submissions, inquiries, suggestions or comments to a member of the Communiqué Editorial Team:

Editor
Suzanne Kinney hfwest@telus.net

Alberta-NWT
Monica Henriques mhenriques@interface-ergonomics.com

Atlantic
Dave Chiasson dave@ergosystems.ca

BC-Yukon
Louise Wynne louise.wynne@norskecanada.com

Manitoba-Saskatchewan
TBA

Ontario
Jeff Casey casylibero@yahoo.ca

Québec
Rose-Ange Proteau rproteau@asstsas.gc.ca

Deadlines for articles and advertising are:

<table>
<thead>
<tr>
<th>Issue</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>November 15</td>
</tr>
<tr>
<td>March</td>
<td>January 15</td>
</tr>
<tr>
<td>May</td>
<td>March 15</td>
</tr>
<tr>
<td>July</td>
<td>May 15</td>
</tr>
<tr>
<td>September</td>
<td>July 15</td>
</tr>
<tr>
<td>November</td>
<td>September 15</td>
</tr>
</tbody>
</table>

Communiqué © 2005 Association of Canadian Ergonomists/Association canadienne d’ergonomie

ACE Member Benefits

- Communiqué — 6 issues annually
- ACE Web site and Members Only Area
- Membership Directory
- Directory of Consultants
- ACE Annual Conference
- Regional workshops and seminars
- Advertised employment opportunities
- Ergonomics (Taylor & Francis) — subscription discount
- Irwin Publishing — discounts
- Professional Liability Insurance Program
- 20% discount at www.online-learning.com
- Member Organization of the International Ergonomics Association (IEA)

Our Association relies on significant donations of volunteer time from ACE members to maintain and improve existing programs and to develop new projects. Be a part of our team. For more information, contact the ACE office. Many thanks to all current and past volunteers!
program in their company or for consultants providing services in the health and safety sectors and who are likely to help companies implement a modified work program.

The approach presented in the guide is based on the following principles:

- Prolonged inactivity is generally detrimental to the recovery of individuals with MSDs.
- The longer workers are absent from work, the lower the probability that they will eventually return to work; to avoid prolonged disability, the case management of injured workers should begin early on.
- The workers’ usual work setting is a privileged environment for their rehabilitation.
- The physical demands of tasks assigned to workers should match their physical capacities, and should evolve as physical capacities increase or decreases.
- Work that is meaningful, valued, and productive can have a positive effect on recovery.
- Modified work programs can only be successful if everyone concerned participates and communicates effectively.
- The identification and correction of work-related risk factors can prevent the development of MSDs among other similarly exposed workers.

Six steps are suggested to set up and implement a modified work program. The guide describes in detail how, according to corporate culture, available resources and practices in various environments, companies can achieve the following steps:

1. Set up a committee to design and implement the program;
2. Describe the current situation in the workplace;
3. Analyze the company’s needs and set program objectives;
4. Determine program content;
5. Implement the program;
6. Evaluate the program.

An algorithm graphically explains the steps to follow with an injured worker as well as the relationship between these steps. The four major steps of this strategy are the following:

1. Identify the injured part of the body among the four most common areas of the body injured (back, neck and shoulder, elbow, hand and wrist).
2. Choose work tasks to suit the injured worker according to priority criteria.
3. Evaluate appropriateness of proposed tasks to suit the physical capacities of the injured worker by using the worksheets for estimating the physical work demands included in the guide.
4. Perform an immediate follow-up and a periodic follow-up to evaluate the modified work assignment and adjust work tasks according to symptoms and capacities.

The guide includes three series of worksheets and forms:

1. The first series of worksheets help front-line workers (e.g. supervisors, members of OHS committees) evaluate the physical demands of the proposed tasks for temporary assignment according to the injured part of the body. This evaluation helps them decide whether the tasks are suitable for the injured worker. Four worksheets are available for each area of the body (back, neck and shoulders, elbow, hand and wrist).
2. The second series of forms are used to communicate to the worker’s treating physician the physical work demands of the proposed tasks for a temporary assignment. According to the Law respecting industrial accidents and occupational diseases in Québec, the treating physician must approve the temporary modified work assignment proposed by the employer for a worker receiving compensation from the Commission de la santé et la sécurité du travail du Québec. These forms satisfy the requirements of this law.
3. The third series of forms allows the treating physician to inform the employer of the temporary work restrictions that apply to the injured worker. The three sheets are easy to fill and available for each area of the body injured (back; neck and shoulder; elbow, hand and wrist). The temporary work restrictions can be used to clarify the selection of a temporary task or to modify the tasks according to the progression of symptoms and the physical capacities of the worker. The user-friendliness of the forms was validated by 48 clinical practitioners during the course of the validation study and have been well accepted by several physicians and occupational therapists.

Finally, the research team has developed training sessions based on the acquisition of the notions included in this guide. These sessions are intended for managers wishing to use the approach as well as for consultants and health and safety professionals who wish to oversee the implementation of a modified work program in a company. The training sessions are currently given in Montreal. A second type of training session is being developed to help front-line workers use the Estimate of Physical Work Demands worksheets mentioned earlier in the article.

**Conclusion**

In closing, we hope that this guide will help reduce the negative consequences of MSDs on the workers’ health and the financial health of companies by promoting the rehabilitation of workers with MSDs and reducing their absenteeism at work.

The joint approach favoured in the set up and implementation stages of the program, as well as all the data on the possible sources of MSD risks suggested in the guide, can also encourage prevention in the workplaces. These measures enable companies to identify MSD risk factors and to reduce occupational injuries.
This guide could be useful for some ergonomists. You can order a copy of the guide (including the worksheets and forms) by visiting the website www.santepub-mtl.qc.ca/omrt. The original Guide (bound, in colour) is sold for $20 (available in English or French). For more information, please contact jean-luc.malo@ergoplan.net or Dr. Susan Stock, the project’s chief researcher (susan.stock@inspq.qc.ca).

References


Baril, Raymond and Bertelette, Diane, Components and Organizational Determinants of Workplace Interventions Designed to Facilitate Early Return to Work: A Summary, Institut de recherche en santé et en sécurité du travail, 2000, Montreal, Quebec, 60 pages, www.irsst.qc.ca/fr/_publicationirsst_784.html


Stock, Susan.; Baril, Raymond; Dion-Hubert, Colette; Lapointe, Claire; Paquette, Sonia; Sauvage, Josée; Simoneau, Serge; et Vaillancourt, Claude; Troubles musculo-squelettiques : Guide et outils pour le maintien et le retour au travail, Direction de santé publique, Agence de développement de réseaux locaux de services de santé et services sociaux de Montréal, Québec, 2005

Stock, Susan.; Baril, Raymond; Dion-Hubert, Colette; Lapointe, Claire; Paquette, Sonia; Sauvage, Josée; Simoneau, Serge; et Vaillancourt, Claude., Work-related Musculoskeletal Disorders : Guide and Tools for Modified Work, Direction de santé publique, Agence de développement de réseaux locaux de services de santé et services sociaux de Montréal, Québec, 2005

Stock, Susan; Deguire, Suzanne; Baril, Raymond; Durand, Marie-Josée. Travailleuses et travailleurs atteints de lésions musculo-squelettiques : les stratégies de prise en charge en milieu de travail dans le secteur électrique/électronique de l’Île de Montréal «Workready» Phase 1 : Volet qualitatif québécois. DSP, RRSSS, 1999, Montréal, Québec, 82 pages, www.irsst.qc.ca/fr/_publicationirsst_829.html

We are now into the summer months, work is perhaps piling up but you could only do your best and the family holidays to head out to Halifax in August are fast approaching.

I am at a loss for words and unable to pull it all together in limited time to ensure the next Communiqué is completed on time. So what should I do? I thought I would cheat and submit an editorial I wrote to the Ontario Newsletter in July 2002. It has been revised to apply to anywhere in the country but the message remains the same.

“If you keep on doing what you have always been doing, you keep on getting what you have always been getting”

— A. Robbins

I like that saying. Reminds me a little about the book “Who moved My Cheese?” by Dr. Spencer Johnson. This easy read helps organizations and people to realize that change can be good. If you haven’t read it yet, get a copy and find a shady spot under the tree. Now I believe that change is good…

I recall a time when national or provincial associations catered mainly to the “southern” group in and around Toronto. The conferences and workshops were well worth the travel but required a number of days away from work not to mention the travel, accommodation and meals. At one time, our employers likely paid all the expenses including paid time away from work.

Things have changed over the years. One big change of course is what an employer is willing to contribute to the employee’s professional development request. At one time, all expenses were paid for, whereas now, part of it is paid for, nothing at all or if all expenses are reimbursed, you could only attend one seminar/workshop every so often (not necessarily yearly) and it may be within a limited geographical area.

On a more positive note; however, are the location of conferences and workshops being offered in various areas of the province and country now. These changes are credited to individuals who have realized that major metropolitan centers are not always necessary to attract attendees. A number of local functions have been successful and have likely attracted people who would not have been able to attend should an alternate location be considered.

So let’s take ACE Ontario for example since I reside in this populated province... Over the past years we have had workshops in various locations around the province including Sudbury, Ottawa and Kingston whereas at one time the event would take place in Southern Ontario only and usually Toronto or closely surrounding areas. This would be understandable, as the chances of attracting a certain number of people would be greater. This variety is greatly due to not only dividing the province into regional sections with regional representatives but primarily due to the various members who have volunteered many hours to ensure a quality event took place. Some names that come to mind include Carrie Taylor Van Velzer from Taylor’d Ergonomics who provided an excellent workshop in Sudbury (2000) and Jeff Pajot, who has organized a number of events in the Ottawa and surrounding area. We had Brenda Mallat and her group involved in the ACE Conference in Windsor last year. Things are also picking up again in Toronto thanks to Don Patten and others, as well as picking things up in B.C. with Aaron Miller and ACE members in that area. You succeed by simply trying!

Overall, the ability to host a workshop or conference (of any size) in the various geographical areas – some more isolated than others – depends on you, the members. This would apply to all regions of ACE throughout Canada. Even when membership numbers are lower as compared to Ontario and Quebec, for example, dedicated people to the west and to the east contribute valuable volunteer hours to organizing interesting events. The goal is not necessarily to make money but to ensure that all ACE members can attend a workshop, conference or specialized speaker within their area.

Should you be interested in having an event in your area sponsored by ACE, contact your regional representative. Perhaps we will soon see events listed for Thunder Bay, Saskatoon and St. John’s!

Safe travels everyone and I’ll see you in Halifax!
The IEA K.U. Smith Student Award honors a deserving student responsible for an application of or contribution to ergonomics/human factors (E/HF). The next award will be presented during the IEA 2006 XVIth Triennial Congress, scheduled to convene July 10-14, 2006, in Maastricht, Netherlands.

The Award winner will receive a cash award of US $3,000. Depending upon need, an additional stipend for travel to the Congress also may be awarded to the winner. Certificates will be awarded to two runners-up.

Any student enrolled in an accredited post-secondary institution (college, university, technical, or vocational school) worldwide is eligible to apply for the award. All areas of E/HF are eligible for consideration. Examples of applicable projects include an applied E/HF project, a human performance study or analysis, a design project or product, a research project undertaken in the laboratory or field, or a theoretical/conceptual contribution to E/HF.

A student wishing to apply for the award should submit the following to the IEA Student Award Committee:

1. Five copies of the abstract for a paper that the student has authored, that documents an application of or contribution to E/HF on the part of the student.

2. A resume for the student, with the student’s name, full address, e-mail and phone numbers, institution enrolled in, experience, list of publications, and a summary of accomplishments and/or contributions related to the field of E/HF. The resume should be limited to 4 pages in length.

3. A letter from the student’s academic advisor on institutional letterhead certifying the following: (1) that the paper described in the abstract was written by the student; (2) that the student was enrolled in the academic program at the time that work described in the abstract was carried out; (3) when the work described in the abstract was carried out; and (4) that the abstract is being submitted for the IEA K.U. Smith Student Award.

The IEA Student Award Committee will select the awardee and two runners-up using a two-stage procedure:

1. Review of abstracts and resumes; and
2. Review of full paper.

Students who have successfully passed the first stage will be invited by the IEA Student Award Committee to submit full papers for final selection. Two selection criteria will be used to select the awardee and runners-up:

1. Quality of contribution to E/HF, as documented in the full paper; and
2. Other accomplishments in and contributions to E/HF, as described in the resume.

Deadlines for the award process are as follows:

Oct. 2, 2005: Abstracts, resumes and advisor letters must be received by the IEA Student Award Committee.

Nov. 6, 2005: Applicants eligible for submitting full papers will be notified by this date.

Jan. 8, 2006: Full papers from eligible applicants must be received by the IEA Student Award Committee by this date.

Feb. 5, 2006: Applicants informed of results of award evaluation by this date.

March 1, 2006: Full paper by winner due to IEA 2006 Congress Program Committee by this date. (NOTE: The IEA 2006 Congress Program Committee will reserve a slot for the award winner to present her/his paper. The winner does NOT have to meet the Oct. 1, 2005 deadline for submitting paper abstracts. However, the winner must submit her/his full paper to the IEA 2006 Congress Program Committee by March 1, 2006.)

Submissions should be sent to the Chair of the Student Awards Committee:

Chair: Prof. Michael Smith
Department of Industrial Engineering
University of Wisconsin, Madison
1513 University Avenue
Madison, WI 53706
Fax: 608-262-8454
Email: mjsmith@engr.wisc.edu
A PRELIMINARY QUANTIFICATION OF LOW BACK CUMULATIVE LOAD IN ELITE AND SENIOR SHEEP SHEARERS IN NEW ZEALAND

Diane E. Gregory,
University of Waterloo, Waterloo, Ontario, Canada, N2L 3G1.
dgregory@uwaterloo.ca,
Stephan Milosavljevic,
University of Otago, Dunedin, New Zealand

Jack P. Callaghan,
University of Waterloo, Waterloo, Ontario, Canada

Sheep shearing requires extreme postures, especially prolonged trunk flexion, which has been associated with an increased risk of developing low back pain. However, these postures do not generally result in acute compressive values at L4/L5 exceeding the action limit proposed by NIOSH. Therefore, it may not be peak loading that is responsible for low back pain, but instead cumulative loading over the course of a workday. The purpose of this research was to quantify the low back cumulative load in sheep shearers of two skill levels; elite and senior. Results revealed no significant differences in the magnitude of cumulative compression, suggesting that skill level of the sheep shearers has no substantial influence on cumulative compression, which was determined to exceed 111 MN’s over an 8-hour workday.

Key words: cumulative loading, low back pain, sheep shearing

CHARACTERIZATION OF AEROBIC CAPACITY AND ACCELEROMETRY WHILE CARRYING VARIOUS BACKPACK LOADS

Joan Stevenson¹, Evelyn Morin², Josh Good¹, Sue Reid¹,
Tim Bryant³

¹Ergonomics Research Group, Queen’s University, Kingston Ontario, CANADA, stevensj@post.queensu.ca; ²Electrical and Computing Engineering; ³Mechanical Engineering

The goals of this study were: to examine relationships among aerobic demand, performance time, load and pack type and, to determine if an accelerometer could be used to describe movements during the circuit. Eleven male volunteers were tested on separate days for maximal aerobic capacity (20 MSR) and loads of 5.5, 15.7, 25.5 and 34.3 kg in Pack C and Pack D during a standardized circuit comprised of tasks and marching laps. There were significant differences in timed performance and load (p = 0.001) and between aerobic demand and load (p = 0.008) but not between packs and load. For tasks alone, subjects’ aerobic responses differed significantly by load (p = 0.004), however, only the 34.4 kg load caused greater than a 15% increase in MVO2 from the baseline load. It was possible to discern different activities with a triaxial accelerometer and thus quantify the energy demand of tasks if the load mass is known.

Supported by Defence Research and Development Canada
PWGSC# W7711-0-7632.
arm when lifting and transferring residents. Consistent exposure to the new equipment was important in influencing caregivers’ perception of personal risk when lifting and transferring residents with ceiling lifts. Staff did not perceive a risk differential between ceiling lifts and floor lifts when there was less than full ceiling lift coverage for residents, but clearly preferred ceiling lifts.

**Key words:** patient handling, ceiling lifts, MSI risk

**PREDICTING CUMULATIVE L4/L5 SPINE LOADS AND MOMENTS INCURRED DURING NONOCCUPATIONAL TASKS USING HEART RATE DETERMINED PHYSICAL ACTIVITY LEVEL**

Nadia R. Azar, David M. Andrews
University of Windsor, 401 Sunset Avenue, Windsor, Ontario, Canada, N9B 3P4; n.azar@cogeco.ca

Jack P. Callaghan
University of Waterloo, Waterloo, Ontario, Canada

The purpose of this study was to predict cumulative L4/L5 spine loads and moments incurred during non-occupational tasks, from heart rate determined physical activity level (HR-PAL). Fourteen subjects were videotaped while performing activities in their own homes. HR was continuously recorded during video collection and was subsequently used to calculate the PAL over the course of the 2 hour collection session. Video data were captured to digital format and trimmed into separate clips to match the heart rate file. The clips were analyzed with 3DMatch, a video analysis tool comprised of a rigid link segment model with a joint model, which calculates peak and cumulative loads and moments at the L4/L5 joint. Simple regression revealed that between 50% and 82% of the variance in 7 of the 13 cumulative load measures studied was accounted for by HR-PAL (p < 0.1). Cumulative compression force was predicted the best of all measures studied (R2 = 0.82). No significant differences were found between 9 of the predicted and actual loads (p > 0.1). This initial study suggests that the use of HR for predicting cumulative loads shows promise. Future work is planned to test this method in a number of industrial settings.

**Keywords:** Heart rate, physical activity, cumulative loads, non-occupational tasks

**POSTURE IMPLICATIONS OF DIFFERENT-SIZED OPERATORS OBTAINING A LINE-OFSIGHT IN UNDERGROUND MOBILE MINING MACHINES**

Alison Godwin
School of Human Kinetics, Laurentian University, 935 Ramsey Lake Road, Sudbury, Ontario, Canada, P3E 2C6

Tammy Eger
School of Human Kinetics, Laurentian University

Sylvain Grenier
School of Human Kinetics, Laurentian University & Occupational Health Clinics for Ontario Workers (Sudbury Clinic)

Operators of load-haul-dump (LHD) machines use awkward postures in order to obtain a clear line-of-sight when navigating in underground mine shafts. When driving forward, they position their machines close to the left-hand side of the mine wall, likely due to enhanced visibility on that side of the machine. The sideways-seated posture of the operator dictates that they use awkward postures of the neck, trunk and upper arms. The research used a computer-aided design program to assess the differences in visibility and postural demands on various-sized operators. It was determined that small (1st percentile) and medium-sized (50th percentile) operators have visibility deficiencies when operating in forward driving scenarios. The three sizes of virtual operators each demonstrated decreases in trunk and neck angle with concurrent increases in visible area and critical viewing points when a seat-rotation intervention was introduced.

**Keywords:** sideways-seated posture, mining equipment, anthropometrics

**THE NIOSH LIFTING EQUATION ACCOMMODATES MORE THAN 95% OF FEMALES**

Jim R. Potvin
Department of Kinesiology, University of Windsor, Windsor, Ontario, Canada, N9B 2P4; jpotvin@uwindsor.ca

NIOSH claims that their Lifting Equation accommodates 75% of females, based on the psychophysical criteria for low to moderate frequencies, and designs for low back compression forces at an Action Limit (AL) of 3400 N for infrequent lifting. The purpose of this study was to determine the actual percentage of the population accommodated by the 1994 Equation and to determine the compression forces caused by the resulting Recommended Weight Limits (RWLs). The analysis indicates that approximately 95% of females are accommodated at low frequencies and up to 100% would be capable of lifting the RWL at higher frequencies. In addition, for infrequent lifting, the RWL loads resulted in compression forces close to the AL for lifts starting below knuckle height but the compression forces were generally well below 3400 N for lifts with starting heights above 75 cm. It was concluded that the NIOSH Lifting Equation is much too conservative for most industrial applications unless a Lifting Index of at least 1.5 is used as a cutoff.

**Keywords:** lifting guidelines, psychophysics, low back injury

**3-DIMENSIONAL PEAK AND CUMULATIVE SHOULDER LOADS DURING NONOCCUPATIONAL TASKS**

Christina A. Godin, David M. Andrews, Tara A. Arnold
Department of Kinesiology, University of Windsor, 401 Sunset Avenue, Windsor, Ontario, Canada, N9B 3P4; godin4@uwindsor.ca

Jim R. Potvin
Department of Kinesiology, University of Windsor, 401 Sunset Avenue, Windsor, Ontario, Canada, N9B 2P4; jpotvin@uwindsor.ca

Injury rates for the shoulder joint remain high despite efforts to identify and reduce the risk factors associated with upper limb disorders. To date, shoulder assessments have been limited to peak analyses, ignoring the effects of cumulative loading. Furthermore, there has been no work to quantify the shoulder loads of non-occupational activities. In order to document peak and cumulative shoulder loads during non-occupational tasks, 2-hours of video was collected and analyzed using 3DMatch, a posture sampling tool that incorporates a three dimensional rigid link segment model to calculate reaction forces and moments. Peak flexion and extension moments for both shoulders combined...
ranged from 13.6 Nm to 66.7 Nm, and 6.0 Nm to 26.8 Nm, respectively. These loads are higher than those reported for some occupational tasks, highlighting the importance of considering both work and non-work activities when assessing injury risk.

**Key words:** Non-occupational tasks, shoulder, cumulative loads, peak loads

**OPTIMIZING THE HANDLE GRIP DESIGN FOR CENTRAL VACUUM MACHINES USING INNOVATIVE 3D CAD MODELING TECHNIQUES – A SUCCESS STORY**

*Rajesh Patel, Al Castagna, Dennis L. Kappen*  
C2P Inc-Concept to Product, 1331 Crestlawn Dr, Unit D,  
Mississauga, Ontario, Canada, L4W 2P9, rpatel@c2p-inc.com

The project was aimed at carrying out an ergonomic evaluation of numerous vacuum handle designs available in the market in order to formulate a design guideline to be used for development of a comfortable handle grip design, suitable for North American and European population. The focus of this study was to increase user efficiency by maximizing the forward and backward reach spans of the user, with minimum strain on the wrist. The study helped to determine optimum dimensions of handgrip cross-sections, handgrip length, and handgrip angle related to suction pipe and switch location, for the 1 percentile female to 99 percentile male population. SolidWorks 3D CAD software was creatively utilized to generate dynamic product usage simulations with all body posture movements for different percentile 3D Mannequins. Based on this information, a stylized product that integrated form, function and ergonomic analysis was designed. Plastiflex Hose Systems Innovators, Canada, successfully launched the new design in the North American and European market in 2004.

**Key words:** optimization, handgrip, design

**THE USE OF PREDICTED CUMULATIVE SPINAL COMPRESSION TO DESIGN IMPROVED WORK SHIFTS IN A CHEMICAL PROCESSING OPERATION**

*Judy Village,* Judy Village & Associates, UBC School of Occupational and Environmental Hygiene, 2220 Badger Rd.,  
North Vancouver, B.C. V7G 1T1 village@interchange.ubc.ca

*Jenell TeVelde and Jim Sims*  
Universal Dynamics, Vancouver Washington

Cumulative and peak spinal compression were estimated using biomechanical software (4-D WATBAK, University of Waterloo) for 14 tasks performed in one department of a chemical processing operation. The objective was to reduce work-related injuries, improve the overall work flow, and reduce the overtime requirements. Operators currently work three 12-hour shifts and some overtime with cumulative compression averaging 49.8 MN/s. Rearranging tasks to four 9-hour days reduced cumulative spinal compression by 27.5%. Further reductions are realized with five 7.2-hour days (38%). Recommendations made to reduce peak spinal compressions in tasks will likely assist in reducing cumulative compression should task durations remain unchanged. Few studies have investigated the health and injury effects to workers of 12-hour shifts with high spinal compressions. It is not clear if recovery from the spinal compressions is improved with shorter days but fewer days off, or longer days with more days off.

**Keywords:** Cumulative spinal compression, work shifts, musculoskeletal injuries
Ergo News & Research Briefs

From IRSST
◊ The IRSST is studying the causes of the sudden bursting of tires on heavy duty trucks. http://www.irsst.qc.ca/en/_communique_100106.html

From Arbetslivsinstitutet
◊ Codetermination motivates people to act safely http://www.arbetslivsinstitutet.se/articles/050425.asp
Opportunities for codetermination at work and an empowering climate, which prioritises safety, contribute to people increasing their knowledge of safety issues and their motivation to act safely. This is shown by a study from the Götaleden road tunnel project in Gothenburg. http://www.arbetslivsinstitutet.se/articles/050425.asp
◊ Four principal reasons for Sweden’s high rate of sick leave absences. http://www.arbetslivsinstitutet.se/articles/050412.asp

Health and Safety at Work European Trade Union Institute — Research, Education, Health and Safety
◊ France: professional illnesses are more numerous and more costly June 21, 2005.

MHECCU of UBC

Worksafe BC – WCB

AMI

NIOSH Safety and Health Topic

Institute For Work and Health
Ergonomics Today
◊ The Egg – Aimed at Productive Relaxation for Employees
   May 18, 2005

◊ Flex time Under pressure in Tight Economy may 20, 2005

◊ Sharpen those knives – and Other Advice Omitted by
   Celebrity TV Chefs May 23, 2005

News
◊ WCB Proposed Amendments to the Occupational Health
   and Safety Regulations (“OHSR”). The Policy and Research
   Division (“PRD”) is requesting your input on the proposed
   amendments to the OHSR. This will enable any revisions
   to be made to the proposed amendments prior to the
   public hearing in the fall of 2005. The amendments are
   miscellaneous in nature. Stakeholders are invited to review
   the proposed amendments and provide feedback by June 3rd,
   2005.

◊ S. Leonard Syme Training Fellowships in Work & Health
   —2005 Call for Applications (U of T)
   The Institute is currently accepting applications for the 2005
   Fellowships. The Fellowship awards are intended to support
   young researchers at the masters’ or doctoral level who
   intend to do research in the field of workplace health.
   http://www.iwh.on.ca/about/syme_fellow.php

◊ OSHA news Release: OSHA Unveils Safety and Health
   Topics Page for Landscape and Horticultural Industry may
   document?p_table=NEWS_RELEASES&p_id=11374

--- Invitation ---
“Meeting Diversity in Cyber/Online Ergonomics”

YOU ARE CORDIALLY INVITED

To participate in the 4th International
Cyberspace Conference on Ergonomics,
CybErg 2005 held in conjunction with
Cibergo 2005 (the Spanish-speaking
ergonomics conference). This conference,
CybErg 2005, is an online (virtual)
conference on Ergonomics and Human

Keynote Speakers:
• Prof. Leon Straker, Prof. Robin
   Burgess-Limerick, Prof. Clare Pollock
   (Preliminary guidelines for Wise Use of IT
   by Children)

• Prof. Marcelo Soares (Ergonomics
   and design: a user-centred design method)

• Mr. David Caple (Developing
   Countries — working together to bridge
   the gap)

There are also nearly 100 scientific papers
that will be presented. All these papers
have been peer-reviewed by a panel of
International reviewers. These papers are
in the following areas:

• Physical Ergonomics (physiological
  issues, work-rest schedules,
  anthropometry, work-related
  musculoskeletal disorders, work-place
  layout, manual materials handling, 
  ergonomics in the health industry,
  ergonomics in transport, etc.)

• Cognitive Ergonomics (including
  human error, mental workload, 
  naturalistic decision making, situation 
  awareness, adaptive interfaces, etc.)

• Human Computer Interaction (including
  computer-mediated communication, 
  e-learning, WWW design, building 
  and maintaining online communities, 
  cross-cultural interfaces, accessibility, 
  etc.)

• Health & Safety (including occupational
  health and hygiene, shiftwork, vibration, 
  epidemiological studies, ergonomics in
  safety and security, etc.)

• Ergonomic Methods (including participatory
  design, organisational design, low-cost interventions, usability
  testing, etc.)

• Organisational Ergonomics (knowledge
  management, participative ergonomics, 
  communication and education, etc.)

Costs:
Early-bird registration
(before 1 July 2005): US$100

Later registration
(after 1 July 2005): US$130

Registration includes a CD-Rom copy of
the proceedings and participation in all
online sessions (and of course all your
travel “expenses”)

Registration discounts (US$60) are
available for participants from Industrially
Developing Countries and for full time
registered students.

To find out more and to register:
http://cyberg.wits.ac.za

E-mail Dr. Andrew Thatcher:
cyberg2005@umthombo.wits.ac.za
This section contains information on upcoming seminars and conferences. Readers are encouraged to submit information for inclusion to the Editor. The abstracts are presented in the language(s) that will be used at the conference based on information available at the time of publication. All effort has been made to ensure accuracy, however, it is always best to verify with the conference organizers.

40ème Congrès de la SELF «Le travail humain, facteur de développement durable et de cohésion sociale». Les 21, 22, et 23 Septembre 2005 à Saint-Denis de la Réunion [40th Congress of the Francophone Ergonomics Society (FR) - Saint-Denis de la Réunion 21-23 September 2005]

Call for Papers: Cyberg 2005 - an international cyberspace conference on Ergonomics, 15 Sept to 15 October 2005. Contact Andrew Todd, Junior Lecturer, Department of Human Kinetics and Ergonomics, Rhodes University, Grahamstown. E-mail: a.todd@ru.ac.za. Website: http://www.ru.ac.za/hke

ISSA/ILO XVIIth World congress on Safety and Health at Work World Congress September 18-22, 2005. For more information: http://www.appcluster05.com/app/homepage.cfm?appname=343&moduleid=16


The Third Indian Society of Ergonomics (ISE) ‘Humanizing Work and Work Environment (HWWE) 2005’ International Ergonomics Conference, December 10-12, 2005, Indian Institute of Technology, Guwahati, India. Along with all areas of Ergonomics, there will be a particular focus on small scale sector and cottage industries, which is specifically relevant to the part of the country in which the event will be held. For details visit the IIT Guwahati website at www.iitg.ernet.in , www.iitg.ac.in

Canadian College for the Certification of Professional Ergonomists
Conseil canadien de certification des praticiens en ergonomie
1304 - 2 Carlton Street, Toronto, ON M5B 1J3 Tel/Tél.: (416) 979-3946 Toll Free/Sans Frais: 1-888-432-2223 Fax/Téléc.: (416) 979-1144 Internet/site d’Internet: www.ace.ergonomist.ca E-mail/Courriel: info@ace.ergonomist.ca