



# SAFETY

NEWS

## In this issue

1-4

### Feature Article

Pregnancy and Ergonomics:  
Potential Hazards and Key  
Safeguards

5

### Safety TG News

- Note from the Chair  
- Call for Proposals and  
Reviewers

6

### Book Review

TapRoot® The System for  
Root Cause Analysis,  
Problem Investigation, and  
Proactive Improvement

7

### Conferences

8

### Safety TG Officer Contact Information

### Application for Membership

## A Publication of the Human Factors & Ergonomics Society Safety Technical Group

### Pregnancy and Ergonomics: Potential Hazards and Key Safeguards

*Linda M. Tapp, M.S., ALCM, CSP*

Today, more than half of all American women work outside the home. In 1998, women accounted for 46.2 percent of the total workforce - a percentage that is expected to increase over time (BLS; Misner, et al). Assuming a two percent pregnancy rate and 50 million women of childbearing age, nearly 1 million working women may be pregnant at one time.

With such a large number of employees who may become pregnant, it is important to understand how pregnancy can impact workplace safety. Often, discussion of risks related to pregnancy focuses on chemical exposure. However, ergonomic concerns exist as well.

For example, pregnancy can affect reach distance, balance and lifting tasks; it can also aggravate the effects of repetitive motion. Some research also suggests a link between certain ergonomic stressors and adverse pregnancy outcomes, such as spontaneous abortion, pre-term delivery and low birthweight (AMWA). Several studies have found an increased risk of pre-term delivery among women whose jobs involve a combination of stressful factors, such as standing for long durations, repetitive lifting and working long hours (Henriksen 198+; Mamelle 309+). This article examines ergonomic stressors in the workplace that may affect the pregnant worker and outlines proactive steps the safety practitioner can take to minimize these hazards.

#### THE POTENTIAL HAZARDS

As noted, most employers immediately consider the harmful effects of chemicals in the workplace when first notified of a pregnancy. In addition, many obstetricians will ask for a list of the chemicals that may present a risk of exposure to the pregnant employee.

Less obvious, yet equally important to the pregnant employee's health and well-being, are ergonomic hazards such as awkward postures, heavy lifting, limited rest periods and repetitive force. Back pain and carpal tunnel syndrome (CTS) are relatively common side effects of pregnancy as well, and both may be aggravated by job tasks. In addition, the incidence of both may increase as pregnancy progresses.

Pregnancy alters the body's shape and, thus, the interaction with the worksite. The abdomen becomes increasingly larger, causing progressive postural problems, backache, and impairment of dexterity, agility, coordination and balance. Hormonal changes affect the ligaments, increasing the likelihood of injury (Goodwin). Joints in the spine become less stable and show signs of separation and movement to accommodate the growing fetus.

As the pregnant worker's body changes shape, new hazards related to reach, balance, lifting and repetitive motion may develop. Employers must be aware of these changes in order to continue to provide a safe, comfortable workplace.

*(continued on page 2)*

## Reach Distance

As pregnancy progresses, a woman must lift and maneuver objects farther from her body. For example, a packaging-line employee who has always had a comfortable reach of 15 inches may have a 20-inch reach once into the third trimester due to the increased size of her abdomen. This places additional strain on the arms and shoulders as well as the lower back. A study of working surface height and working surface areas showed that fit problems are likely during pregnancy (Paull, et al 129). In addition, few (if any) anthropometric studies of pregnant women have been conducted, so it is difficult to find standardized information on appropriate workstation design.

Lifting loads farther from the spine is especially dangerous during this time because the woman's muscles and ligaments are already being stressed beyond normal levels. Pelvic muscles relax and spine joints become less stable, which only increases the risk of back injury ("The Most Dangerous Job").

These risks are most prominent during the third trimester, when the reach distance is greatest. A woman lifting 10 lbs. has about 65 lbs. of pressure on her lower back. When this woman is nine months pregnant, this task places approximately 150 lbs. of pressure on her lower back due to the increased distance between the load and the body (Figure 1).

## Balance

The extra weight a pregnant woman carries also affects balance. In a non-pregnant woman, the center of gravity is located just in front of the spine, level with the kidneys. Increased weight during pregnancy shifts the center of gravity forward, which affects balance. Awkwardness, fatigue and tendency to lose balance become critical when quick reaction time or work on elevated surfaces is required. For example, work on platforms or the use of step stools may now present a greater hazard.

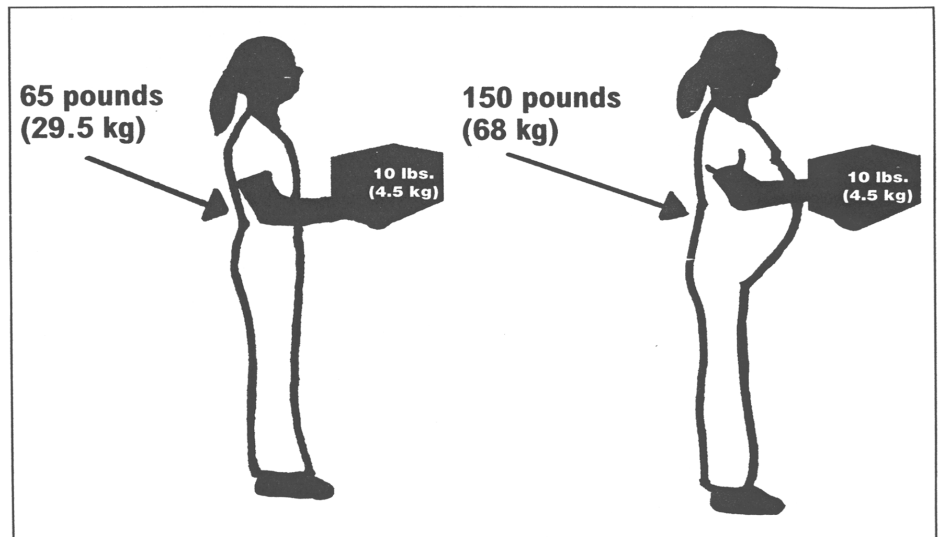


Figure 1. Back stress during lifting.

## Lifting Tasks

Additional body weight and increased reach distance also impact lifting tasks. When a pregnant employee bends over to pick up a box, she is not only lifting the box, but also her extra body weight (Eastman 135). Depending on the size of the abdomen, she will likely be unable to hold the object close to her body. Lifting heavy weights is often thought to be the cause of back pain. However, pregnant women may experience back pain even when their job involves little or no lifting. According to some sources, up to 50 percent of pregnant women experience back pain regardless of their occupation (Colliton).

Lifting may affect the pregnancy and fetus in several ways. Muscular activity alters blood flow in the body, and circulatory blood flow in the uterus and placenta decreases while the woman is in a standing position. In addition, heavy lifting affects intra-abdominal pressures, which may provoke uterine contractions (Bodin 90). Significant physical exertion may lead to hormone disturbances, hyperthermia and nutritional deficits, all of which may have a negative effect on the fetus.

Pregnancy also changes the amount of weight an employee can lift safely. According to a study conducted by Texas University in 1988, which com-

pared upper limb strength of pregnant and non-pregnant working women, non-pregnant women were found to be significantly stronger. The researchers concluded that this finding could have safety implications for the mother and fetus and, therefore, should be considered in job assignment (Goodwin; Master and Smith). American Medical Women's Assn. (AMWA) suggests that risk management programs include a weight restriction of 25 lbs. (10 to 12 kg) for pregnant women (AMWA).

## Standing

As pregnancy progresses into later stages, the curve in the lower back increases, which means the back muscles must work harder to help the woman maintain her balance. As a result, after standing for an extended period, the woman may experience lower back pain. Some studies have shown that prolonged standing is a serious pregnancy risk factor. A study of members of the Assn. of Women's Health, Obstetric and Neonatal Nurses found that those who worked more than 36 hours per week, more than 10 hours per day or who stood for more than four to six hours per day had an increased rate of pre-term deliveries (Gabbel).

## Repetitive Motion

CTS is a common side effect of pregnancy - approximately 28 percent of

pregnant women experience it (Hagberg). The extra fluid in the body can cause swollen feet, hands and legs; in hands and wrists, this extra fluid can compress the median nerve, producing CTS symptoms. Most health practitioners would attribute this development to pregnancy rather than to work. However, tasks that require repetitive motions may increase the possibility of developing the condition. Fortunately, pregnancy-related CTS usually disappears after the birth of the child.

## **INDUSTRY CHALLENGES**

While the challenge of maintaining an ergonomically correct workplace in manufacturing and office environments can often be met successfully, some industries - including the airline industry, healthcare and government services - often have more difficulty accommodating a pregnant worker, particularly in the third trimester, due to required daily tasks associated with jobs in those industries.

### **Airline Industry**

Many airlines "ground" female cabin staff after the first trimester because it is impossible to redesign the interior of an aircraft to accommodate a pregnant worker. Flight attendants routinely help passengers place heavy items in overhead storage areas and push food and beverage carts (which weight up to 143 lbs. fully loaded) up an incline as the airplane climbs. In addition, they are responsible for passenger safety, a function that may include lifting heavy life rafts, opening cabin doors and sliding down chutes. Although situations in which these tasks must be performed are rare, flight attendants must perform these activities during regular practice drills (Goodwin).

### **U.S. Navy**

Servicewomen are another group whose routine tasks may be severely affected by pregnancy. U.S. Navy operational obstetrics policy states that for an

uncomplicated pregnancy of a physically fit, trained servicewoman who works in a safe environment, there is little need to restrict duty. An "ergonomic restriction" would apply "where (an) individual's physical configuration and/or disabilities preclude her from continuing with specific activities (such as lying in a prone position for weapons qualification, diving duty, attendant aboard ships, etc.) or where nausea or fatigability to work becomes a hazard" (Virtual Naval Hospital). The Navy allows women to rest with their feet up for 20 minutes once every four hours; it also limits the employee to a 40-hour workweek during the last three months of pregnancy.

### **Healthcare Industry**

A union study found that 17 of 100 nursing home workers are hurt each year - with half of those incidents involving back injuries. The Ontario Workplace Health and Safety Agency found that nurses and nursing aides are particularly susceptible to sprains and strains. In many cases, the injuries are attributed to tasks that involve moving patients ("The Most Dangerous Job").

In addition, female physicians have an increased risk of premature labor compared to the general population. Some research suggests that this risk may be the result of long workhours and excessive standing. Fifty percent of female physicians have their first baby during residency training, while 25 percent have their second baby during this period (AMWA). Few medical schools have written policies regarding the health and safety of pregnant physicians or students.

## **WORKER RIGHTS IN THE U.S. & ABROAD**

In the U.K., under the Control of Substances Hazardous to Health (COSHH) regulations, an employer must address any risk introduced during pregnancy. The regulations identify several physical hazards that may be cause for con-

cern: handling, repetitive tasks, vibration, temperature extremes, ionizing radiation, work posture and travel.

The employer may adjust work conditions or hours, or offer job transfer or paid leave. COSHH regulations also state that a new risk assessment (job analysis) must be performed whenever the workplace changes. If elements of a particular job may pose a risk to pregnancy, a formal risk assessment must be performed and appropriate corrective actions (in the form of workplace modifications) taken.

Under the European Directive on Pregnant Workers, an employer must provide a safe system of work to all women of reproductive age, their unborn children and working mothers who breast-feed. It suggests that facilities be provided in which pregnant women may rest (ideally, lying down).

In Sweden, a woman who performs physically heavy work has the right to receive a less strenuous job during the 60 days before her due date. If not possible, she may receive paid leave (the same as sick leave). In contrast, female employees in Mexico must show laboratory documentation stating whether they are pregnant when applying for a new job. This is reportedly done to determine who will pay for the delivery.

Such a policy is a stark contrast to U.S. laws (such as Title VII of the Civil Rights Act of 1964) that make it illegal for employers to discriminate based on pregnancy in hiring, discharging and compensation, or in terms, conditions and privileges of employment. Therefore, in the U.S., any modification or job transfer should be reviewed with the human resources department and/or legal counsel prior to its enactment. Although the safety practitioner may have the employee's best interests in mind, it is important not to violate her rights.

*(continued on page 4)*

## SOLUTIONS

Many firms have established ergonomic programs and strive to provide a comfortable, safe work environment for all employees. Designers typically attempt to create a workstation that will accommodate the smallest (5th percentile female) to the largest (95th percentile male) worker. Adjustable workstations may meet this criteria - until a worker becomes pregnant.

In addition to work restrictions, the safety professional can implement several proactive steps to protect pregnant employees. Each pregnancy is unique, so care must be taken to match job requirements to the individual's performance and capabilities. All aspects of the job should be assessed when considering workplace modifications.

## Potential Modifications

While application of sound ergonomic principles benefits all workers, the following actions can be considered when modifying a pregnant worker's job.

- Assign less physical tasks.
- Restrict lifting to 25 lbs.
- Adjust work hours (e.g., flexible scheduling, day shift rather than night).
- Vary tasks to avoid static posture.
- Install foot rests (for seated and standing workers) so that one foot can be alternately raised.
- Adjust height of work surfaces and chairs. Women late in pregnancy may prefer a considerably lower table height than common guideline heights (Paull, et al 129+).
- Limit standing time to less than three hours a day.
- Modify break schedule (e.g., shorter, more frequent breaks).
- Reduce amount of work performed at heights (such as on ladders or step-stools).

## CONCLUSION

Pregnant workers require extra attention with respect to potential ergonomic hazards that are either created or exacerbated by pregnancy. Thus, when a pregnancy is first reported, the safety professional must work with the occupational nurse/physician, employee and

her physician to assess these hazards. Appropriate accommodations can prevent injuries, enhance the employee's comfort, and help her better handle the stress of work combined with the physical changes related to pregnancy.

## REFERENCES

- American Medical Women's Assn. Position Paper on Pregnancy During Schooling, Training, and Early Practice Years. Alexandria, VA: AMWA, 1993. [http://www.amwa-doc.org/publications/Position\\_Papers/pregnancyhtm.htm](http://www.amwa-doc.org/publications/Position_Papers/pregnancyhtm.htm).
- Atlanta Maternal-Fetal Medicine. "Restrictions for Work and Environment During Pregnancy." P.C. Clinical Discussions. Vol. 2, No.6, July 19, 1994. <http://www.atlanta-mfm.com/clindisc/vol2no6.html>.
- Bauer, I. and T. Keupfer. "Ergonomics and Pregnancy: Fact Sheet." Toronto, Ontario: Occupational Health Clinics for Ontario Workers Inc., 1993.
- Bodin, L., et al. "Heavy Lifting During Pregnancy: A Hazard to the Fetus? A Prospective Study." International Journal of Epidemiology. 19(1990): 90-97.
- Colliton, J. "Pregnant With Back Pain? Suggested Comfort Tactics." The Physician and Sportsmedicine. July 1996. [http://www.physsportsmed.com/issues/july\\_96/coll\\_pa.htm](http://www.physsportsmed.com/issues/july_96/coll_pa.htm).
- Eastman Kodak Co. Ergonomic Design for People at Work. Vol. 2. New York: Van Nostrand Reinhold, 1986.
- Gabbel, S.G. "Work During Pregnancy: Potential Risks and Benefits." Ob/Gyn Clinical Alert Archives. July 1999.
- Goodwin, T. "Cabin Crew Maternity Policy: The Health and Safety Issues." Aviation Medicine. <http://www.aeronet.co.uk/csprog.html>.
- Goulet, L. and G. Theriault. "Association Between Spontaneous Abortion and Ergonomic Factors: A Literature Review of the Epidemiologic Evidence." Scandinavian Journal of Work Environment and Health. 13(1987): 399-403.
- Hagberg, W. "Carpal Tunnel Syndrome During Pregnancy." Pregnancy Today Online. <http://www.pregnancytoday.com/reference/articles/carpal.htm>.
- Henriksen, T.B., et al. "Standing at Work and Pre-Term Delivery." British Journal of Obstetrics and Gynecology. 102(1995): 198-206.
- Mamelle, N., et al. "Prematurity and Occupational Activity During Pregnancy." American Journal of Epidemiology. 119(1984): 309-322.
- Marbury M.C. "Relationship of Ergonomic Stressors to Birthweight and Gestational Age." Scandinavian Journal of Work Environment and Health. 18(1992): 73-83.
- Master, W.Y. and J.L. Smith. "Reaction Time and Strength in Pregnant and Non-Pregnant Employed Women." Journal of Occupational Medicine. 1988.
- Messing, K. "Women's Occupational Health in Canada: A Critical Review and Discussion of Current Issues." <http://hwcweb.hwc.ca/canusa/papers/canada/english/occup.htm>.
- Misner, S.T., et al. "Women and Occupational Health." <http://hwcweb.hwc.ca/canusa/papers/usa/english/occup.htm>.
- "The Most Dangerous Job: Nursing." CAW Health, Safety and Environmental Newsletter. Aug. 1997. <http://www.caw.ca/hse/newsletter/5.8.html>.
- Paull, J., et al. "Pregnant Women and Working Surface Height and Working Surface Areas for Standing Manual Work." Applied Ergonomics. 26(1995): 129-133.
- U.S. Bureau of Labor Statistics. Handbook of Labor Statistics. Washington, DC: U.S. Dept. of Labor, 1998. <http://www.bls.gov/op/pdf/cpgaat9.pdf>.
- Virtual Naval Hospital. "Operational Obstetrics and Gynecology: Appendix A Dept. of Navy, Bureau of Medical and Surgery, OPNAVINST 6000.1A Management of Pregnant Servicewomen." Feb. 21, 1989. <http://www.vnh.org/OBGYN/append.html>.

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# Human Factors and Ergonomics Society

## Safety Technical Group

### Note from the Chair

*Stephen Young*

It is that time of year again, and many of you have prepared submissions to this year's HFES annual meeting. We are looking forward to another group of good submissions on March 19th. As stated in the next column, we are also looking for people to review proposals. If you are interested, contact Curt Braun. The more people who sign up as reviewers, the fewer papers that each reviewer is assigned, so please consider becoming a reviewer this year.

The Safety TG membership is up to around 600. We hope that you would take the time to consider telling others within the Society about this Technical Group (and possibly signing someone up yourself). Also, don't forget to renew your own membership in the group, which can be done at the HFES main web page ([www.HFES.org](http://www.HFES.org)). We have a number of things to offer members, not the least of which is the TG newsletter.

We have an e-mail group membership of 215, and we hope that this will grow as people find it to be useful. You can subscribe using the instructions provided in the box at the right of this page. We also have a domain name specifically for the Safety TG: [www.HFES-SafetyTG.org](http://www.HFES-SafetyTG.org). This site can also be accessed from the HFES main web page.

We look forward to seeing you at the Annual Meeting in Minneapolis and please feel free to contact any of the officers of the Safety TG if you have any comments or suggestions regarding ways to improve the Technical Group.

### Check out the Safety TG's Web Site!

We recently obtained a new domain name. Go to:

<http://www.HFES-SafetyTG.org>

We welcome all comments and suggestions about the site.

Please email the webmaster Jean Schiller  
([jschiller@appliedsafety.com](mailto:jschiller@appliedsafety.com)).

### Call for Proposals and Reviewers

The Human Factors and Ergonomics Society 45th Annual Meeting will be held in Minneapolis/St. Paul, Minnesota, October 8-12, 2001. It will be held at the Minneapolis Hilton and Towers and the Minneapolis Convention Center.

Proposals are due four weeks later than usual, and a single deadline (March 19) has been set for all presentation types (e.g., lectures, posters, demonstrations). Decisions will be made by May 18. Please contact Curt Braun for more information regarding proposal submissions and applicable deadlines.

If you would like to review proposals for the Safety Technical Group, please contact Curt Braun at the University of Idaho via telephone (208) 885-2540 or via email [cbraun@uidaho.edu](mailto:cbraun@uidaho.edu).

### Come join us!

In our last issue of *Safety News*, we encouraged all members of the Safety TG to join the e-mail group, as a way to keep up-to-date with current happenings within the TG as well as post safety-related questions to members.

The response was amazing, and activity on the list rose to levels never before experienced. Some interesting discussions have proceeded on topics such as: ladder climbing speed estimation, RULA technique for analyzing office work, the Poke-Yoke technique, and office safety. All of these messages are archived on our email web site (<http://groups.yahoo.com/group/safetytg>).

Come join in on the discussion – pose a question or help answer one. And here's an even better suggestion from one of our members ... if you've asked a question, consider summarizing the answers and submitting it to *Safety News* for all to benefit from the groups knowledge.

To subscribe to the email group, go to <http://groups.yahoo.com/group/safetytg>. Click on the "Subscribe" link on the right side of the page. On the next page you will need to create a Yahoo! ID and password. Then choose the options you prefer (e.g., daily email, digest form, web only) and you are all done. Please contact Elaine Wisniewski ([ewisniewski@appliedsafety.com](mailto:ewisniewski@appliedsafety.com)) if you have questions.

## Book Review: TapRoot® The System for Root Cause Analysis, Problem Investigation, and Proactive Improvement

*Authors: Mark Paradies and Linda Unger  
Publisher: System Improvements, Inc.  
ISBN: 1-893130-02-9*

This was a very difficult book for me to review. It has many excellent characteristics but there are several negatives that significantly reduce its effectiveness. The first good point, noticeable immediately in Chapter 1 which is even titled Vision, is the overall vision of the book. If you value safety, this book is almost inspirational in the way that those late night infomercials can be. It says over and over again how important it is not only to do safety, but to do it right. Their vision makes sense, but it is hardly new. Safety experts have been promoting comprehensive safety programs for many years.

This book is an absolute treasure trove of methodology. If you want to do the most detailed safety analysis or accident investigation imaginable, you can follow the TapRoot® system. It really appeals to the engineer in me because there are lots of flowcharts, checklists, and forms. They provide the recipe that, if you follow it, you can create the ideal safety environment. And I have to agree that, if you can follow the entire system, you will have an extremely effective safety program. But again, there is another side. The method is very time consuming. They even state in Chapter 3 that is "pains-taking". In order to fully apply the method, you would really need a team of safety practitioners working around the clock. There are short-cut methods provided, but then of course you lose some of the comprehensiveness that the system provides.

They cover a whole slew of program components, including proactive, reactive and behavior-based safety, which they renamed "observation-based proactive improvement". They also have an entire chapter on control charting, renamed "trending", which is very comprehensive. It includes interval, rate, and standard process charts. They include a lot of the statistics required to use control charts, but also provide examples that makes it easy to follow.

All of the program components are well thought out and explained clearly. But there is probably a little too much detail. For an experienced safety investigator, the detail is redundant and probably not helpful. For a novice, it may be intimidating and off-putting. But if you want a single refer-

ence that has everything you could ever want to know about root cause analysis and safety investigation and detailed steps on how to do it, this is the book for you.

One of my biggest complaints with the book is the amount of self-promotion. The book was published by the company that sells software and seminars based on the TapRoot® system. They waste no opportunity to suggest that readers may want to take a seminar or hire them for a consulting job. And the software is promoted extensively. There are ® and TM symbols everywhere. In the process chart chapter, virtually every example has "drawn by TapRoot® trending software" at the end. It wouldn't be so annoying except that when you look at the flowcharts that are copyrighted or trademarked, they really aren't anything that a good safety practitioner couldn't do themselves. There are some topics that are not included in the book, and you are directed to the Taproot® web site or to send in the registration card to receive.

So do I recommend the book? It's hard to say. I don't think I have ever read a book that was such a goldmine of information and yet so irritating at the same time. Perhaps if you buy the book with the intention of flipping through it and only picking out the good parts, it is worth the investment. And some of the advice on how to convince upper management to invest in safety may be helpful to anyone who has never tried it before.

*Reviewed by Marc Resnick*

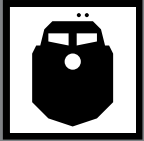
### Read a safety-related book lately?



Is it a book that you would want to recommend to your colleagues in the safety profession? Even if you've read a book and you would not recommend it, that is valuable information, too.

Consider submitting a book review to the next edition of Safety News. The next issue will most likely be in print in early summer.

Please submit your book review to the newsletter co-editors, Jean Schiller ([jschiller@appliedsafety.com](mailto:jschiller@appliedsafety.com)) or Elaine Wisniewski ([ewisniewski@appliedsafety.com](mailto:ewisniewski@appliedsafety.com)).



# CONFERENCES



## **March 14-20, 2001– International Congress on Work Injuries Prevention, Rehabilitation and Compensation**

For more information about this international congress in Adelaide, Australia, e-mail: [secretariat@workcongress5.org](mailto:secretariat@workcongress5.org).

## **March 15-16, 2001– 3rd European Convention on Injury Prevention and Safety Promotion**

This convention will be hosted by the European Consumer Safety Association and held in Vienna, Austria. For more information, email: [ecosa@consafe.nl](mailto:ecosa@consafe.nl)

## **March 26-29, 2001 – International Conference on Applications of Human Performance in Health & Disability**

This conference will take place in Cairo, Egypt. Among other topics, health and safety in the workplace will be addressed, including: health and safety in pharmaceutical and construction industries, health and safety standards and regulations, and training and educational programs. For more information, visit <http://www.med.uc.edu/meded/continuing/egypt/>

## **April 10-13, 2001 – 23rd Annual International High Technology Safety, Industrial Hygiene and Environmental Symposium and Exhibition**

Held in New Orleans, Louisiana, this conference will be sponsored by the Semiconductor Safety Association. It will provide comprehensive coverage of EH&S issues and will address the engineering, manufacturing and business challenges that will be confronting the semiconductor and other high technology industries in the next several years. For more information, visit <http://www.semiconductorsafety.org>

## **May 21-23, 2001 – SafeComm 10: 10th International Conference on Safe Communities**

Anchorage, Alaska, will be the site of this year's conference, which carries the theme: "Safe work, safe play, around the clock". It is convened by The Alaska Injury Prevention Center. For more information, contact Diana Hudson, [nhudson@alaska.net](mailto:nhudson@alaska.net)

## **June 4-7, 2001 – International Society for Occupational Ergonomics and Safety**

The International Society for Occupational Ergonomics and Safety (ISOES) 2001 conference will be held in Fairfax, Virginia, just 17 miles from Washington, D.C.. This conference is devoted to the practice and theory of ergonomics, safety and design in occupational and non-occupational environments. It brings practitioners and researchers together to explore common ground, promoting the assimilation of scientific data with that of the practical world. For more information, please visit <http://isoes.org> or email [isoes@biz-comm.com](mailto:isoes@biz-comm.com).

## **July 29-August 1, 2001 – International Conference on Computer-Aided Ergonomics and Safety**

The International Conference on Computer-Aided Ergonomics and Safety will be held in Maui, Hawaii. For more information, please visit <http://www.ergonet.net/caes2001.html> or email Waldemar Karwowski at [karwowski@louisville.edu](mailto:karwowski@louisville.edu).

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*Safety News* is a publication of the Safety Technical Group of the Human Factors and Ergonomics Society. The Safety Technical Group is interested in research and applications concerning human factors for safety in all settings and attendant populations, including transportation, industry, military, office, public building, recreation, and home environments. Contributions to *Safety News* should be sent to the Editors.

**Safety  
News**

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