

C R O E T

Center for
Research on
Occupational and
Environmental
Toxicology



NEWSLETTER

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CROETweb.com:

Achieving a Higher Level of Usability for Professionals and the General Public

Big changes are happening at CROETweb.com, CROET's occupational safety and health (and toxicology) web resource directory. In the last issue of this newsletter, we announced the arrival of Dan Olson, CROET's new Webmaster, and Dede Montgomery, CROET's new Occupational Safety and Health Specialist. Dede and Dan have been working together to increase the utility of CROETweb.com as a technical resource not only for the general public, but also for the working health and safety professional. We hope that CROETweb.com will become the most useful and highest-quality single resource for up-to-date occupational safety and health information by linking to diverse, credible and accurate resources relevant to the broad needs of workers and practitioners within Oregon. And although Dan and Dede have been here only a few months, CROETweb.com has already undergone significant changes, including:

- Daily updating
- Several new information topics
- A directory of "significant new links we recommend"
- Improved "new content" markers
- Spanish language content

Many of the fundamental changes to CROETweb.com have been occurring behind-the-scenes. With Dede's expertise and connections in



the occupational safety and health and industrial hygiene world, she is actively soliciting feedback from other experts in the field who not only use CROETweb.com, but who also have good ideas about the types of new information that will improve its usefulness as a reliable and current web resource. These experts are best able to critically review the information content and suggest changes that ultimately improve the usefulness of CROETweb.com for health and safety professionals and the general public, thereby benefiting everyone.

With a more aggressive approach to keeping the information current, and with daily updating, CROETweb.com is now a continuously evolving resource for occupational safety and health information. To keep frequent users current with this evolution, CROETweb.com now incorporates identifiers that mark links to new information with the date, in red, when the link was added. These identifiers automatically disappear after 3 months. Another way for visitors to stay current is by visiting the **"SIGNIFICANT NEW LINKS WE RECOMMEND"** page, which can be accessed in the left column of the CROETweb.com homepage. This page provides links to resources that have recently appeared on the web, and that we feel are noteworthy enough to warrant visitors' attention.

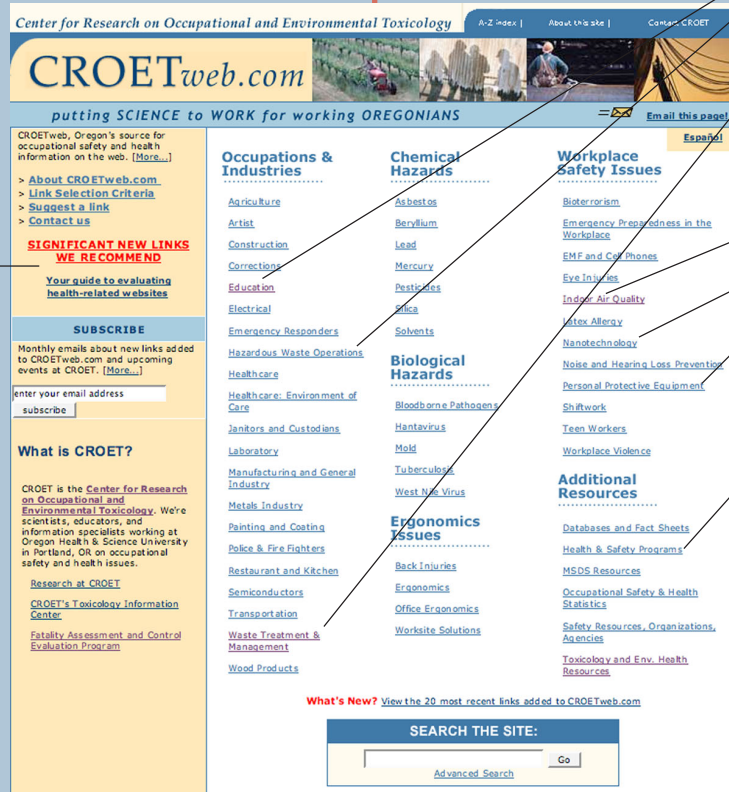
In response to recommendations from various people via email, phone, conference and

exhibits, Dede has introduced several new information topics to the CROETweb homepage.

These new topics include: "Education", "Hazardous Waste Operations" and "Waste Treatment & Management", which have been added to the Occupations and Industries section; "Indoor Air Quality", "Nanotechnology" and "Personal Protective Equipment", now included as topics within the Workplace Safety Issues heading; and "Health and Safety Programs", which can be found under the Additional Resources heading. The latter topic is loaded with "hands-on" information about written H & S programs, audits, evaluations and inspections, accident investigations, training programs, safety committees, workplace monitoring, and safety culture research. And of course, Oregon-specific information, when available, is also included within all topics.

Dede and Dan are also in the process of reorganizing and adding new information to CROETweb.com's existing topics. They have completed the reorganization of our Agriculture, Construction, Corrections, Manufacturing, Metal Industry (formerly Electroplating), and Wood Products links. A good example of the changes being introduced can be found within the Construction page, which has been reorganized to include 13 subtopics. This reorganization allows a user to more easily find

specific topics within Construction and supports a significant expansion of the material covered. For



example, subtopics now include information on fall protection, trenching and excavation, and noise in construction among other key topics. On the Agriculture page, a new subtopic, Landscaping, has been added. These many subtle changes being made to CROETweb.com's key topics pages are adding up to create a much more useable and comprehensive occupational safety and health information resource.

One final example of the many positive changes being made to CROETweb.com involves its Spanish language content pages; the format is becoming similar in appearance to the general format. It is hoped that someday the Spanish language information content will closely match that of the general English language pages. When that day comes, CROETweb.com could then exist as two identical websites, but in two different languages.

Please visit (or better yet, bookmark) CROETweb.com soon and see how we are improving your access to accurate and timely safety and health information on the web. And if you have an idea about how CROETweb.com can better serve your needs, we would like to hear from you. All suggestions are encouraged.

Recent feedback about CROETweb.com from Occupational Safety and Health Professionals:

"Thanks for the info. I just found some great info on the glass artist industry for a site visit I am going to make in the coming weeks."

"Wow, this is a great resource for construction safety and health. I was able to find the big construction hazards that kill workers like trenching and fall protection. I was able to find electrical issues under the other safety hazards. I was able to find the heavy equipment under road building. I liked the Spanish link. It is all very easy to maneuver around in. Nice job!"

"It is really awesome! Easy to navigate and find key construction information."

"Nice website! Good informative yet brief abstracts attached to links to the appropriate external websites. Easy to access and find my way."

CROET Scientist Working with Northwest Tribes to Address Fish Contamination Issues

In 2000, the US Environmental Protection Agency conducted a survey of chemical contaminants in fish taken from the Columbia River Basin (CRB). Ninety-two chemicals were found, the most frequently measured being heavy metals, DDT, chlordane, PCBs, dioxins and furans. These chemicals, which are present at varying concentrations in a variety of fish species, are thought to pose only a small hazard to most people, because fish make up only a small portion of the average diet, about six pounds per year. However, Native American people who live in the Northwest eat large amounts of fish, between 50 and 300 pounds a year. Based on this information, the EPA conducted a risk analysis and estimated that the lifetime cancer risk among the most traditional of tribal members may be as high as 1-in-one-thousand or greater. This is much higher than what the US government typically regulates for other hazards, usually at the 1-in-one-million or 1-in-100,000 level. Thus, there is real concern that tribal populations are at increased risk for not only cancer, but other diseases as well, including damage to liver, kidney, immune and nervous systems.

To address this concern, CROET's Dr. William Lambert and research associates, Brenda Hoppe, MS, Louise Kling, MS and Michael LaFlamme, PhD are implementing a risk communication program that helps tribal people make informed decisions on what can be done to minimize health risks from consuming CRB fish. Their program follows community-based participatory research principles and community members play a direct role in the design and conduct of research as partners. Community members are getting the word out about the research and promoting the use of the research findings. These actions will strengthen existing community capacities to make decisions on policies to reduce unnecessary exposure to toxins. Dr. Lambert's group is working with the Yakama Nation Fisheries Program and the Yakama Nation Indian Health Center (Indian Health Service). This project is funded by a grant from the National Institute of Environmental Health Sciences.

Overall, the major objectives of this program are to inform and educate the Yakama Nation and other

Northwest tribes about health risks related to the contamination of subsistence fish, to foster problem solving in the tribal community, and to promote culturally appropriate protective actions to reduce exposure. But developing an appropriate and feasibly implemented message may not be easy to accomplish. As a primary source of food for thousands of years, salmon and other fish species continue to be the foundation of nutritional health for Northwest tribes. Salmon are the cornerstone of spiritual and cultural identity, and for many are a livelihood and major source of income. So it would be neither practical nor appropriate to suggest that the tribes reduce their use of a resource upon which the people's lives and culture so profoundly depend. And, because the beneficial aspects of a diet rich in fish are well established, alternative foods actually present their own long-term health risks.

Thus, the major challenge facing Dr. Lambert's group is to balance the apparent contradiction between encouraging fish as healthful nutrition versus the avoidance of toxins, all while giving precedence to the cultural and spiritual role of fish in the lives of Northwest tribal members. To this end, the Lambert group is developing educational materials that promote the utilization of "safe species", meaning those fish (such as salmon) that are known to have the least amount of contamination, and to encourage the use of safer but culturally appropriate methods of food preparation that avoid the use of especially contaminated parts or that allow fat soluble contaminants to drip off and away from edible portions. These educational materials plus training are being made available to healthcare providers and educators who can counsel patients that have concerns about the safety of eating fish. Healthcare providers are being encouraged to target their message to the elderly, women of child-bearing age, and those who are pregnant or breastfeeding, since these represent populations who are potentially the most vulnerable. Dr. Lambert's group is also encouraging tribal healthcare providers to promote cancer screening for all their patients and developmental screening for children so that any potential problems can be caught and addressed early on.

While these personal measures will provide health benefits, Dr. Lambert recognizes that the ultimate goal of all concerned is to clean up the Columbia River system in order to protect the health of the fish, and thereby the health of all people who eat those fish.

Much of the contamination comes from "legacy pollutants", such as DDT, PCBs and heavy metals, which are no longer being discharged to the river system, but take decades to break down and disperse. And since dams have limited the natural cleansing process that occurs as seasonal high flows wash sediments out to sea, the tribes recognize the importance of preventing new sources of contamination from entering the system. Dr. Lambert is hopeful that by providing useful and accurate information to the tribes, they can be most effective in advocating for cleaning contaminated sites, such as those in the Portland Harbor, and for preserving an important cultural and nutritional resource for generations to come.

CROET Student Intern Earns 2nd Place Award at 2005 Intel International Science and Engineering Fair

Oregon Episcopal School junior Allison Rhines earned a second place award in the category of Medicine and Health at the Intel International Science and Engineering Fair, held May 8-14 in Phoenix, Arizona. Her project, titled "An Analysis of Brain Tissue Sections for Proteins Targeted by the Genotoxicant Methylazoxymethanol (MAM)", studied the mechanisms and toxic effects that DNA-damaging chemicals exert on the function and survival of neurons in the brain. Allison demonstrated that abnormal accumulations of certain proteins in the brain correlates with DNA damage caused by MAM. The significance of this research is that MAM neurotoxicity could be used as a model for other types of neuro-degenerative disease as well as the neurological damage seen in normal aging.

Allison conducted her research after school and on weekends under the supervision of CROET's Dr. Glen Kisby. Dr. Kisby has mentored several high school student interns and science fair awardees. For her award, Allison received a full tuition scholarship to Drexel University, a \$1500 monetary prize, and best of all, a minor extra-solar planet that will be named in her honor. Of the experience, Allison says "I have always been interested in biology, especially neuroscience, but this experience has introduced me to a plethora of new possibilities. I plan to work in Dr. Kisby's lab over the summer as well as next school year and will compete in the Siemens-Westinghouse Talent Search as well as the Science Talent Search (STS) in the fall".

The Hazards of Noise in the Workplace

Excessive noise is one of the most common health hazards encountered in the workplace, affecting an estimated thirty million workers in the United States. Hazardous noise can cause hearing loss, create physical and psychological stress, reduce productivity, interfere with communication, and contribute to accidents and injuries by making it difficult to hear warning signals.

Although noise-induced hearing loss is one of the most common occupational illnesses, it is often ignored because it usually develops subtly over a long period of time, there are no visible effects, and, except in very rare cases, there is no pain involved. What does occur is a progressive loss of communication, socialization, and responsiveness to the environment. In its early stages it affects our ability to understand or discriminate speech, because detection of higher frequencies is lost first. As hearing loss progresses to the lower frequencies, it begins to affect one's ability to hear sounds in general.

The adverse effects of noise can be simplified into three general categories: Primary Effects, which include temporary or permanent changes in the threshold level at which sound is first detected, acoustic trauma, and tinnitus (ringing in the ears); Secondary Effects on Communication and Performance, which may include personal isolation, annoyance, difficulty concentrating, absenteeism, and accidents; and Other Effects, which may include stress, muscle tension, ulcers, increased blood pressure, and hypertension.

Sound intensity is measured in units of decibels (dB), which describes the strength, or 'pressure', of the vibrations of sound. And, although a variety of devices have been developed to measure sound pressure, the first warnings that the noise level may be hazardous can actually be our own subjective responses: When noise levels are above 80 decibels (dB), people have to speak very loudly; between 85 and 90 dB, people have to shout; and when noise levels are greater than 95 dB, people have to move close together to hear each other at all. If you have ringing in your ears or difficulty hearing normal sounds for several hours after you leave work, then the sound level is definitely excessive. Your hearing can be damaged if you are continually exposed to noise greater than 85 decibels over an 8-hour period, and exposure to 110-decibel noise can damage hearing after just 15 minutes! A general rule of thumb is that

if you need to shout to be heard, the sound level is in a range that can damage hearing.

The following are examples of sound intensities generated by various devices: 90 dB is about the loudness of a large truck from 5 yards away; motorcycles, snowmobiles, and similar engines range around 85 to 90 dB; 100 dB is typical of some rock concerts; jackhammers produce a sound pressure of 120 dB from 3 feet away; and 130 dB is produced by a jet engine from 100 feet away. Not only can hearing be threatened by loud noises, high-frequency ultrasonic devices, which produce sounds inaudible to the human ear, can also damage hearing. The upper frequency of sound heard by the human ear is approximately 15-20 kilohertz (kHz – one kHz equals one-thousand vibrations per second). Most of the audible noise associated with ultrasonic sources, such as ultrasonic welders or ultrasonic cleaners, consists of sub-harmonics of the machine's major ultrasonic frequencies. For example, many ultrasonic welders have a fundamental operating frequency of 20 kHz, a sound that is at the upper frequency of audibility to the human ear. However, a good deal of noise may be present at 10 kHz, the first sub-harmonic frequency of the 20 kHz operating frequency, and is therefore potentially injurious to most persons.

The Federal Occupational Safety and Health Administration (OSHA) and Oregon OSHA have established regulations governing workplace noise and require employers to determine if workers are being exposed to excessive noise levels. If excessive, employers must then implement feasible engineering or administrative controls to eliminate or reduce the hazardous levels of noise. And where controls are not sufficient, employers must implement an effective hearing conservation program.

Noise monitoring usually begins with a walk-around survey, using a sound-level meter, to screen for noise exposures and to determine if additional monitoring is necessary. When screening for noise exposures, sound level meter measurements and estimates of the duration of exposure are sufficient to determine if a potential problem exists. These spot readings can be used to determine the need for a more complete evaluation. OSHA recommends the following general approach:

1. Tour the facility and develop a detailed understanding of facility operations and potential noise sources. Take the tour with someone who is familiar with plant operations. Speak with knowledgeable personnel about operations and maintenance requirements. Make notes on a diagram of the floor plan if possible. Look for indications that noise may be a problem.
2. Use a sound level meter to take spot readings of operations that are in question. It may be useful to mark the sound levels on a diagram of the floor plan. Make notes regarding what equipment is on or off.
3. Estimate noise exposures by identifying workers and their locations and estimate the length of time they spend in different areas or how long they operate particular equipment or tools.

If the results of the walk-around survey indicate that time-weighted average (TWA – this is the average exposure calculated for an 8-hour work shift) exposures of 80 dBA or more might be occurring, then additional noise monitoring should be performed. This additional monitoring can be accomplished with the use of dosimeters, which measure the accumulated noise exposure for one worker over a specific time period, such as the 8-hour workday. TWA exposures at or above the action level of 85 dBA require employers to institute a continuing, effective hearing conservation program. This is referred to as the action level. Hearing conservation programs include training, personal exposure monitoring of affected employees, implementing engineering controls, audiometric testing, hearing protectors and recordkeeping. TWA exposures exceeding the PEL of 90 dB require that feasible engineering or administrative noise reduction controls be implemented. Other groups such as the National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) recommend adhering to an 8 hour TWA of 85 dB.

An effective hearing conservation program can prevent hearing loss, improve employee morale and a general feeling of well-being, increase quality of production, and reduce the incidence of stress-related disease. Unfortunately, some places of employment have not successfully implemented effective hearing conservation programs, and employees are experiencing occupational noise-induced hearing loss (NIHL). This hearing loss not only affects the worker on the job, but also can substantially adversely affect the worker for the remainder of his

or her life, not to mention increase financial costs to the employer. Advocates of hearing loss prevention remind us that engineering controls to reduce noise in the workplace when it is feasible are strongly preferred to simply requiring hearing protection for workers.

What's on the horizon for noise and hearing protection? Researchers are investigating connections with diet, antioxidants and nutrition as potential sources of protection against adverse effects of noise. They are also learning about how hair cells regenerate and the potential reversibility of hearing loss. Sadly, we are finding a rise in hearing loss in children, teenagers and young workers entering the work arena due to exposure to loud noise sources, such as music and "walkmen". Ultimately, success in preventing NIHL will require increased education for people of all ages, source control and effective hearing conservation programs.

- More than 30 million Americans are exposed to hazardous sound levels on a regular basis, and an estimated 10 million already have hearing loss from noise (<http://www.nidcd.nih.gov>).
- The results of a 1996 Canadian study suggest that prolonged use of Walkmans causes a deterioration in hearing sensitivity.
- 5.2 million 6-19 year olds have hearing loss directly related to noise exposure.
- Over the last 10 years, the percentage of 2nd graders with hearing loss has increased 2.8 times; hearing loss in 8th graders has increased over 4 times.

Additional Resources:

QUIET! Oregon OSHA's Concise Guide to Hearing Protection (PDF)
<http://www.cbs.state.or.us/external/osha/pdf/pubs/3349.pdf>

Noise and Hearing Conservation eTool
<http://www.osha.gov/dts/osta/otm/noise/index.html>

OSHA Safety & Health Topics: Noise and Hearing Conservation
<http://www.osha.gov/SLTC/noisehearingconservation/index.html>

CROET WEB: Topic: Noise and Hearing Loss Prevention
<http://www.croetweb.com/links.cfm?topicID=27>

Center for Research on Occupational and Environmental Toxicology

CROET, the Center for Research on Occupational and Environmental Toxicology at Oregon Health & Science University, conducts research, provides consultations and offers information on hazardous chemicals and their health effects. CROET's 100+ scientists and research staff explore a range of questions relating to health and the prevention of injury and disease in the workforce of Oregon and beyond. CROET's Toxicology Information Center is open to the public and is staffed to answer Oregonians' questions about hazardous substances in the workplace and elsewhere. CROET's Web site also provides answers to questions about industries found in Oregon through links on a series of pages devoted to industry-specific topics.

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OUTREACH

CROET will provide exhibits at the following conferences.

Central Oregon Occupational Safety & Health Conference

Eagle Crest Resort - Redmond, Oregon

September 13-16, 2005

Southern Oregon Occupational Safety & Health Conference

Smullin Center - Medford, Oregon

October 19-21, 2005

Western Pulp & Paper Workers Safety & Health Conference

Red Lion Hotel on the River - Portland, Oregon

November 29 - December 2, 2005

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Oregon Health & Science University includes the Schools of Dentistry, Medicine, Nursing and Science and Engineering; OHSU Hospital; numerous primary care and specialty clinics; multiple research institutes and several outreach and public service units. OHSU is an equal opportunity, affirmative action institution.

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