

and Environmental Sa NEWSLETTER

May-June 1998

CASE WESTERN RESERVE UNIVERSITY

Ergonomics in the Laboratory

Yes, you've probably heard the word many times. But do you know what ergonomics really means? How it applies to you and your work?

Ergonomics is a means of optimizing the way a system functions by adapting it to human capacities and needs—in common terms, it's a way of fitting the task to the person. In our daily lives in the workplace, we use principles of ergonomics to find positions and tools that minimize stress on the body while working.

Ergonomics has gotten a lot of press lately because of the long hours people sit at computers. But all manual and repetitive work done for hours on end places stress on the body, and many laboratory tasks require these painstaking and lengthy procedures—pipetting, sitting at the microscope, labeling small jars or test tubes. These tasks can contribute to poor posture, repetitive stress injury, and other ailments.

While working, do you experience pain, numbness, or tingling in parts of your body? If so, it may be caused by components of your workstation placing unnatural stress on your body. Our department can help by doing an ergonomic evaluation of your workstation and possibly making some recommendations to improve the situation. Some simple changes may be all it takes to make you more comfortable.

For further information about workstation assessments, call Dick Harley (x5865) or Paige Wietelmann (x2739) from Safety Services.

See related article about ergonomics and microscope use on page 4.

Sewer Gas

Remember to regularly clean your laboratory's cup drains to prevent sewer gas from coming into the lab. There is water in the traps, and odor is caused when the water evaporates.

To prevent this, clean the drains by pouring a few gallons of water into the traps every few weeks to a month, or you may smell an odor emanating from the trap. Many odors are caused by sewer gas. If you receive complaints about odors, please do this simple task. If you have any questions about this procedure call Safety Services at x2907.



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recycling Materials for the Still

The amount of materials our department has received for distillation and recycling has decreased considerably in the past few months. We are trying to make the process as easy as possible for researchers to participate in this highly desirable program.

One of the issues that has caused problems in the past has been discoloration of the newly recycled acetone wash, caused by the disintegration of the storage can's liner. We now have storage receptacles that will not cause discoloration.

We also have instituted a lab "pick up" which will allow for quicker turn-around time for materials. When you have several gallons of acetone wash that is ready for recycling, call us--we will pick up the material from your lab and return it when the procedure is completed.

The department's spinning band still is currently set up to recycle acetone wash. Xylene from histological procedures, as long as it has only traces of wax or alcohol, is also readily recyclable, and we have also recycled ethylene. However, these are not the only options—if your lab produces many gallons of a specific type of waste over a short period of time and you think some of it could be distilled, contact us with the suggestion.

Recycling is an effective approach to waste minimization and helps us meet government-mandated programs required of all producers of large amounts of potentially hazardous waste. It is also a win-win proposition: it saves you money and minimizes waste. Please look into your lab practices to see how you can contribute to our waste recycling and reclamation program. Call us at x2907 with any questions about the procedure or to decide if your laboratory a good candidate for this program.

Floor and table halogen lamps have been very popular recently. But because of the intense heat and they have caused them to be considered unsafe.

The halogen bulb is very hot when it is on and will easily ignite any ordinary material it comes in contact with. The many instances where these halogen lamps have fallen on combustible material have caused a fire; there are also instances where the lamps have fallen or otherwise contacted things that have caught fire. Even touching the bulb can cause severe burns.

For these reasons, the University Office of Engineering and Residence Life has prohibited the use of these lamps in residential buildings. The Department of Occupational and Environmental Health (DOES) strongly recommends that halogen lamps not be used in any CWRU building.

If you have any questions please call the Office of Safety Services (x5865).

Upcoming Training Sessions

Radiation (x2906)

- New Training:** June 19(9-12), 30(1-4), 21(1-4)
- Retraining:** June 17(2-3), 26(10-11), 17(10-11)
- X-ray Training:** call office to set up session

Chemical (x2907)

- OSHA Lab Standard:** Mondays 1-4 (Service Building Conference Room)

Bloodborne Pathogen (x2907)

- New Training:** Mondays 3-4 (Service Building Conference Room)
- **Retraining:** (Service Building Conference Room) June 24 (2-3); July 9 (10-11),

WITH LASERS

Lasers are becoming increasingly popular on campuses, finding a wide variety of uses. Chemists use them to carry out photochemical, pyrolytic, and other reactions. And the benefits from medical applications of lasers are nothing short of astounding. With these technological advancements comes the necessity for workers to know not only how to work with lasers, but to understand and protect themselves from potential hazards. This article outlines how lasers work, the various types of lasers, and the procedures to follow for safe use.

Laser is an acronym for *light amplification by stimulated emission of radiation*. Radiation in this case occurs in the portion of the electromagnetic field with insufficient energy to induce ionization or breakup of the atom (i.e., it is nonionizing). Nonionizing radiation occurs in the radio frequency, microwave, infrared, visible and ultraviolet ranges.

The radiation emitted by lasers is unique. It is monochromatic—made up of one or very few wavelengths—depending on the material used to emit the beam. It is coherent, meaning it is a tight narrow bundle of waves, doesn't spread out, and can be finely focused. The individual rays of light diverge very little, so that a beam of fairly uniform intensity can travel great distances unchanged. Finally, lasers are very bright because they contain an intense amount of radiant energy.

Lasers are classified according to power levels and emitted wavelengths. Laser classification provides warning to users by identifying the hazards associated with the corresponding levels of accessible laser radiation and serves as a basis for defining the use of labels and instruction, control measures and medical surveillance. Manufacturers are required to classify and appropriately label their lasers and laser systems.

Class 1 lasers are essentially safe because their power is weak and they do not emit hazardous

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Radioactive SH

Like all waste, those items with radiation must be separated from trash and thrown away in containers. The same is true of SHARPS, which need to be discarded in a cardboard box.

The Radiation Safety Office has questions about this topic later in the article. Some tips concerning safe and proper disposal of radioactive pipettes and other items considered SHARPS. Broken test tubes or microscopes should be disposed of in yellow bags for radioactive waste because they pose a potential danger to those handling them. Instead, they should be placed in a box, which when full should be sealed and labeled "Warning—SHARPS Radioactive."

One suggestion is to clearly label the bag for these items, and when full, tape it shut and place it in a box. All SHARPS materials are considered radioactive and do not have to be disposed of by anyone in the lab or from the Radiation Safety Office any more than necessary.

All infectious material and needles and syringes must go into the red boxes. Do not place "mixed" items that are both infectious and radioactive—in cardboard boxes.

Please call the Radiation Safety Office at x24



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periods is not what the human body was designed for—it requires holding one's body in an unnaturally rigid position. Microscope locations and positions can exacerbate the problem by forcing the worker to sit in a precarious position, hold arms and legs at various awkward angles, and place strain on the neck and back.

In order to minimize stress on the body, it is important to adopt a correct ergonomic working posture. This means fitting the workstation to the worker, not vice versa.

Below are some questions concerning the proper ways to sit and use a microscope for extended periods of time, just one example of the many potentially straining tasks done in the lab. Answering “no” to these questions means that you are not sitting in an ergonomically correct way. Over time, this can lead to the sort of pain and tingling associated with repetitive strain injuries.

A Posture Quiz:

1. Are you sitting back in the chair, rather than perching on it?
2. Is the height of the chair adjusted so that your feet are resting comfortably, flat on the floor?
3. Is there an even pressure along the backs of the thighs?
4. Does the chair support your back in an upright position? Ideally, it should support to beyond the level of the shoulder blades.
5. Are the microscope eye-pieces in line with, or extending over, the front edge of the bench?
6. Is the vertical position of the eye-pieces a little high for comfort, so that your head is upright?
7. Are you gazing slightly downwards into the eye-pieces, as opposed to tilting your head and 'looking straight-ahead' into them?
8. Are your thighs clear of the under-surface of the bench?
9. When operating the focus and stage controls, are your forearms resting on something, either the bench or microscope arm rests?

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The photo above shows poor posture at the microscope. The one below exhibits proper posture at an ergonomically adjusted workstation.

needed. Battery-operated laser pointers, such as the type used in professional meetings and presentations, are usually in this class.

Class 2 and 2a lasers have low power and emit visible light. They can cause harm if viewed for longer than 1000 seconds or if they have enough power to cause pain when viewed for longer than .25 seconds (the eye aversion response time). No special precautions are required for use with this class of laser; the concept here is that the human aversion to bright light will protect a person.

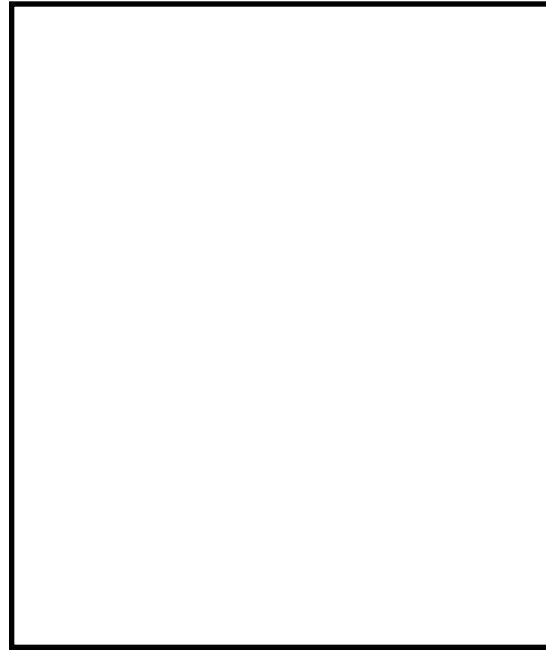
Class 3a and 3b lasers require special signs with the laser warning symbol and the word "CAUTION" (for 3a lasers) or the word "DANGER" (for 3b lasers). These lasers are moderately powerful and can be hazardous even if incidental exposure occurs. Class 3b lasers can cause ocular damage both through direct and diffuse exposures. Safety measures needed include proper engineering controls (such as enclosures, limited open beam paths, and service access panels) and personal protective equipment in the form of special eye protection.

Class 4 lasers are high-powered, require the same signage as 3b lasers, and need explicit controls and standard operating procedures. This class can cause serious eye damage. Special precautions must be taken to avoid diffuse reflections of the beams off dust or moisture in the air; such reflections can be strong enough to cause eye injuries. They can also cause serious skin burns and pose potential electrical and fire hazards as well.

For the most part, lasers can be used very safely when workers are properly trained and the proper administrative and engineering controls are put in place. Make sure everyone in the lab who may need to use laser equipment is trained in all standard operating procedures. Other general rules for laser use are:

for the use of the laser

- use appropriate eye protection
- Services for help in selecting the proper eye protection
- heed warning signs
- turn off the laser or shutter the laser when not in use



Example of the laser warning sign available from Safety Services.

- know the location of the laser
- diffuse reflections
- position yourself so that you are not in the beam path
- above eye level
- possible.

Most lasers are types 2 or 3a and may require other protective measures for the eyes. Safety Services can provide information with any class of laser used in a laboratory concerning laser safety and eye protection. Other related topics include:



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10. Are you taking regular breaks from the microscope, e.g. two or three minutes every half-hour? This needs urgent consideration. Computer users are recommended to take five minutes every hour, and microscopy work is probably more physically demanding.

Poor positioning is one of the major risk factors in the burgeoning amount of repetitive strain injuries being reported in the workplace. The questions above are designed to make you think about how you sit while working and if you may need to adopt a new position. If you have questions or concerns about correct ergonomic working posture or repetitive tasks which may cause strain or injuries, call Dick Harley (x5865) or Paige Wietelmann (x2739) at Safety Services.

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