LASER ACCIDENTS – COLLATERAL DAMAGE

In the majority of laser accidents it is the person operating the laser who is injured. However, in a small percentage of laser accidents it is other people who are working in the room containing the laser who are hurt.

An accident occurred several years ago at UC Irvine in which a person entering a laser laboratory just to use a computer near the optical table suffered an eye injury. The laser had been left operating and unattended in an unsafe condition – the beam was reflected off the plane of the optical table at an upwardly angle. The person injured looked in the general direction of the optical table before seating himself at the computer work station and was struck by the beam in one eye. The laser in use was a Ti:Sapphire laser with a nearly-invisible 800 nm beam.

In order to avoid problems such as this, you can follow some simple rules:

- Optically isolate laser use areas from other areas of the laboratory. Laser curtains of other forms of beam barriers can be used for this purpose. Never set up lasers in high foot traffic areas.
- Do not leave lasers operating and unattended. This is true for all lasers, but especially true for lasers which generate invisible beams (ultraviolet and infrared beams).
- Warn other people in your laboratory when dangerous manipulations such as beam alignments are underway so that they can stay away from the area. Post prominent warning signs.
- After manipulating optics in laser beam, check around the room with an infrared viewer scope to see if there is any stray laser radiation off the optical table. This will work for visible and infrared beams only – not for ultraviolet beams.
- Provide protective eyewear to other people in the laboratory if they need to perform tasks within the nominal hazard zone (where there is the potential for laser-caused eye injuries).
IMPROPER BEAM ENCLOSURE MATERIALS

Be careful what materials you choose to use for the construction of laser beam enclosures and barriers. For ultraviolet laser beams almost any material which is opaque to the beam wavelength is suitable. However, when operating visible and infrared beam lasers, do not use paper or poster board beam barriers. Visible and infrared laser beams with average power of greater than about 0.4 Watt can ignite paper beam barriers, potentially causing smoldering, smoke and even fires. We have had a couple of minor fires on the UC Irvine campus caused by laser beams striking paper surfaces. In one case a piece of poster board was set on fire by an infrared laser beam, and the person who discovered the poster board on fire compounded the problem by tossing the burning poster board into the trash can, setting its contents on fire. A fire extinguisher was needed to resolve this issue.

The best type of beam barrier to use for all laser applications is black-painted or anodized metal (aluminum or steel). Some people scuff up the surface of the metal prior to paining in order to better diffuse laser beams that strike it.

Kentek Corporation makes some excellent beam barrier material called Ever-Guard®. It is made of anodized metal and it has dimples in it to absorb and diffuse laser beams. Unfortunately, it is somewhat expensive, costing about $100 for an 18 inch by 12 inch sheet of the material http://www.kenteklaserstore.com/ProductInfo.aspx?productid=PT-EB

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MEMORABLE QUOTE

"Common sense is the collection of prejudices acquired by age eighteen."
Albert Einstein (1879-1955), German/American Physicist

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EMERGENCY MEDICAL CARE

In the event that you or somebody else in your laboratory suffers an eye or skin injury caused by a laser:

1. Turn off the laser involved in the accident immediately and unplug it. Post a “Do not use!” sign on the laser to ensure that it is not operated again until it can be determined that it is safe.
2. Keep the injured person calm. If an eye injury is suspected, keep the person in an upright position.
3. Make sure the injured person receives immediate medical treatment if the injury is serious – injured persons need to be seen by a doctor as soon as possible.
2. Arrange for transportation of the seriously injured person to a medical facility. The victim might be in shock or have impaired vision so self-transportation is not a good idea. See the UC Irvine Injuries and Medical Treatment poster for locations for emergency treatment. Note that emergency treatment centers are different for undergraduate students, graduate students, and employees. http://www.ehs.uci.edu/MedEmergPoster.pdf
3. If the injury is life-threatening (electrocution), call 911 immediately. Call the UC Irvine Police at x4-5222 (949-824-5222 from a cell phone). Perform CPR if you are trained to do that.
4. Minor skin injuries can often be treated by rendering First Aid in the laboratory.
5. Call the UC Irvine Laser Safety Officer, Rick Mannix (949-824-6098 office; 949-293-7021 cell) or contact him through the UC Irvine Police. If the Principal Investigator responsible for the laser involved is not present at the time of the injury, he/she must also be notified as soon as possible.

If you have any questions concerning laser safety, please contact Rick Mannix from EH&S (949-824-6098; rcmannix@uci.edu).

BE SAFE!