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|  | Tool Type | HANDOUT | Last Reviewed | 4/24/15 |  |
|  | Geography | ALL | Source: | OHSI |  |

LASER SAFETYTOOLBOX TALK HANDOUT

# BENEFITS

You may think that the risk of exposure to radiation is only a hazard for healthcare or veterinary workers who work with or near X-ray machines. But many types of devices emit or produce potentially harmful radiation, including lasers.So it’s important that workers who work with lasers understand the hazards that these devices may pose and how to protect themselves.

**HOW TO USE THE TOOL**

Adapt this handout for your OHS program, operations, equipment, and the laser safety and radiation requirements in the OHSand related laws in your jurisdiction. Give it to workers as part of a safety talk to educate them on the types of lasers, the hazards these devicescan pose and the steps they can take to protect themselves.

**LASER SAFETYTOOLBOX TALK HANDOUT**

**What Is a Laser?**

The word “laser” is an acronym which stands for **L**ight **A**mplification by **S**timulated **E**mission of **R**adiation**.**

A laser device produces non-ionizing radiation, known as “laser light,” which can be visible or invisible.

**Laser Classifications**

|  |  |
| --- | --- |
| **Class** | **Safety** |
| Class 1 | * Safe under conditions of normal use. * A typical telescope or microscope of normal power can be used to collect the beam without harm to eye or skin. * More powerful lasers can be enclosed to prevent worker exposure to the direct and reflected laser beam and be given this classification. |
| Class 1M | * Safe under normal viewing condition (i.e. not using a telescope or microscope). Optical instruments such as telescopes and microscopes collect and magnify the light emitted from the laser and concentrate it into the eye. * Powerful lasers with large beams or beams which spread quickly may be Class 1M because only a small percentage of the beam enters the eye. |
| Class 2 | * Visible light laser of no more than 1.0 mW continuous wave power. * Safe if a worker's response to very bright lights (“Blink Reflex”) isn’t suppressed. When exposed to the beam, a person will quickly close his/her eyes and turn their head before injury to the eye takes place. This response is known as the “Blink Reflex.” |
| Class 2M | * Safe because of the Blink Reflex unless viewed through a telescope or microscope. Under these conditions immediate injury to the eye may take place. * As with Class 1M lasers, the visible beam is very large or spreads quickly after leaving the laser. |
| Class 3R | * Visible or invisible laser beam. * Visible lasers no more than 5 mW continuous wave power. * Blink Reflex will protect workers from visible lasers unless a telescope or microscope is used. * Exposure to beam may cause temporary “flash blindness.” * Laser pointers typically fall into this category. |
| Class 3B | * Powerful laser no more than 500 mW continuous wave power. * Direct beam and beam reflected from mirror-like surfaces causes immediate injury to eye and may injure skin. * Reflection from matte surfaces rarely harmful to eye and skin. * Eye protection likely required and nominal hazard zone distance must be known. |
| Class 4 | * Most hazardous classification of laser. * Most industrial, medical, cosmetic and research lasers fall into this category. * Immediate injury to eye and skin if exposed to beam or reflection of beam from a shiny or matte surface. * Depending on beam characteristics, fire from beam and reflected beam possible. |

**Health and Safety Hazards**

A laser may injure a worker through a number of mechanisms. At low intensities, and/or with prolonged use, the laser can “bleach” the colour receptors in the eye, causing loss of colour vision. The laser beam may burn the surface of the skin or eye (the eye is particularly susceptible to damage). For visible light lasers (commonly used in cosmetic procedures) and for near-infrared lasers, the lens of the eye can focus the laser beam onto a point at the back of the eye in the same manner as a magnifying glass can focus the sun’s rays. In this manner, even small lasers (e.g., laser pointers) can cause permanent damage if misused. Pulsed lasers may cause micro-explosions in tissue; the resulting shock waves can damage cells leading to loss of vision and skin lesions.

In all cases of suspected injury, medical attention should be given immediately and the supervisor and employer informed as soon as possible. A worker briefly exposed to a low powered laser (Class 1 to 3R) beam may experience “flash blindness.” Though no permanent injury may result, temporary loss of useful vision or a startle reaction may cause secondary effects. For example, a lift-truck operator struck with a bar-code scanner beam could be involved in a workplace collision.

**Laser Dos & Don’ts**

* + DO make sure you know about the hazards associated with working with lasers and control measures.
  + DO follow the instructions provided by the employer and manufacturer’s operating manuals. For Class 3B and Class 4 lasers, written Standard Operating Procedures must be available.
  + DON’T knowingly expose yourself and others to either the direct laser beam or its reflection.
  + DO know the class of Laser(s) you’re working with and the nominal hazard zone (the space where exposure to the laser beam is hazardous), if applicable.
  + DO wear and use the protective equipment required by the employer.
  + DON’T forget to report any hazards or injuries to your supervisor.