Light Sources and Laser Safety

Module 1-3
of
Course 1, *Fundamentals of Light and Lasers*
Figure 3-1 *Light Waves*
Figure 3-2  White light, laser light, and light emitted by an incandescent bulb
Highly directional beam
(narrow cone of divergence or beam spread)

Figure 3-3  Concentrated directionality of laser light
Figure 3-4 *Adding coherent and incoherent light waves*
Figure 3-5  Types of incandescent filaments. Filaments are arranged upon support structures within the bulb in a variety of ways. The filament itself may be either straight, coiled, or coiled coil.
Figure 3-6  Mercury HID lamp. This cutaway drawing shows the construction of an Hg-HID lamp. The inner envelope is of quartz; the outer envelope of borosilicate glass (adapted from Kaufman and Christensen, 1972).
Figure 3-7  Diagram of a gas arc lamp with water jacket for cooling
(a) pn junction

(b) Movement across junction

(c) Photon generation

**Figure 3-8**  *Simplified theory of LED operation*
Figure 3-9  Schematic diagram of the eye
Figure 3-10  *Absorption characteristics of the eye for different wavelengths*
Figure 3-11  *Important regions of the electromagnetic spectrum*
Figure 3-12  Focusing of parallel light rays from a distant source or laser beam to a small spot on the retina
Figure 3-13  *Intrabeam viewing conditions with eye intercepting a laser beam*
Figure 3-14  Anatomy of the skin
Figure 3-15  *Absorption of light in transparent materials*
Figure 3-16  *Using an optical filter to reduce beam irradiance*
Figure 3-17 Laser area warning signs for lasers approved prior to 2000. Some may still be in use in laser environments.
Figure 3-18 General structure (top) and samples (bottom) of the new DANGER, CAUTION, and NOTICE warning signs adopted in the year 2000 (Note: The actual signs are in color, as described in the text. The colors do not show up on the black-and-white versions shown here.)
Figure 3-19  *Causes of most laser accidents*
Figure 3-20
(Laboratory 1-3A: Irradiance)
Figure 3-21
(Laboratory 1-3C: Windows and Mirrors)
Figure 3-22
(Laboratory 1-3C: Windows and Mirrors)
Figure 3-23
(Laboratory 1-3C: Windows and Mirrors)