

34—Welding and Cutting

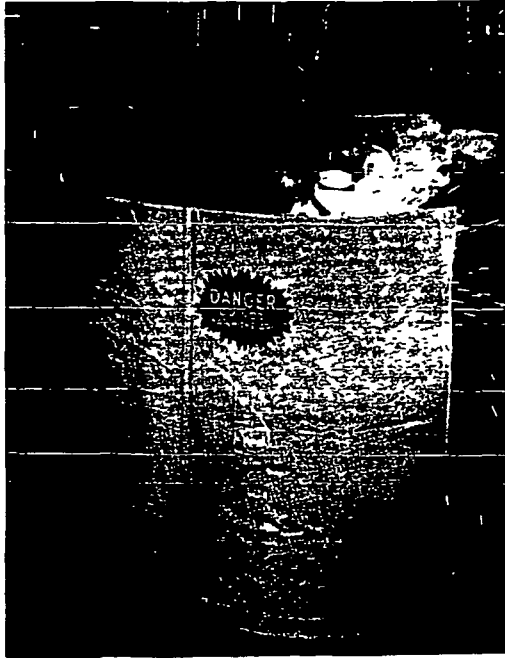


FIG 34-10 —Self-standing safety shield provides close-quarter protection, rolls up for storage

meter should be installed at each torch connection

Air is used to cool the torch and electric current cables. Water is also used for cooling, generally where the welding current is more than 250 amp. The water supply line, even if city water is used, should be equipped with a strainer to keep out impurities which might get into the torch and plug the water cooling passages.

In the gas-shielded tungsten arc torch (Fig 34-9), gas is conducted to the welding point through orifices in the torch around the electrode holder. Cooling water goes through passages through the torch handle and about the holder. In the smaller torches, ceramic cups are used. A torch for heavier work generally has a water-cooled gas cup.

Other Welding and Cutting Processes

There are several heat sources for welding and cutting which are presently in the experimental stage, such as friction, ultrasonics, and

lasers. During each stage of their development, these heat sources require guarding and the evolution of a set of safe practices.

For example, the *laser* (Light Amplification by Stimulated Emission of Radiation) presents the hazard of eye damage from the optically amplified light beam, which because of its intensity, can do damage even at great distances. All employees should therefore be given preemployment and periodic followup eye examinations. Most companies require that employees work in pairs when using laser equipment.

To confine the laser beam, suitable shields should be developed and installed. Since a reflected laser beam is also hazardous, the work area should contain no glossy surfaces.

Power supplies for lasers are high-voltage equipment, which should be operated with the precautions developed for this type of equipment.

See discussion in Chapter 19, "Personal Protective Equipment" and Chapter 37, "Industrial Hygiene."

Common Hazards

Light rays

Electric arcs and gas flames both produce ultraviolet and infrared rays which have a harmful effect on the eyes and skin upon continued or repeated exposure. The usual effect of ultraviolet is to "sunburn" the surface of the eye, which is painful and disabling but temporary in most instances. However, permanent eye injury may result from looking directly into a very powerful arc without eye protection. Ultraviolet may also produce the same effects on the skin as a severe sunburn.

Production of ultraviolet radiation is high in gas-shielded arc welding. For example, a shield of argon gas around the arc doubles the intensity of the ultraviolet radiation, and, with the greater current densities required (particularly with a consumable electrode), the intensity may be five to thirty times as great as with non-shielded welding such as covered electrode or gas-shielded metal arc welding.

Infrared has only the effect of heating the tissue with which it comes in contact. If the heat is not enough to cause an ordinary ther-