most ducts are normally not moved and the ventilation system does not remove the fumes. According to reports, this type of system has been effectively used in shipyards for the control of welding fumes in confined areas. In view of this experience it should therefore be a satisfactory means of control for welding fumes in tanks. However, supervision and education are necessary to make such systems effective.

Where the room volume per welder is large, natural ventilation within the plant is usually sufficient to prevent accumulation of excessive conventration of fumes from plain steel welding. Circulating fans directed from the side help to dilute the fume which may be concentrated in the breathing zone of the welder.

Another means of control is the use of personal respiratory equipment. Air line respirators and fume respirators have been developed which will provide adequate protection. Some manufacturers have on the market welders' helmets with facilities for providing fresh air to the wearer. Use of this type of equipment has been limited. Since the welder is already burdened with helmet, goggles, and protective clothing he probably will not be receptive to a respirator. It is sufficient in most welding for the employee to wear an ordinary helmet and to arrange the position of the work so as to prevent the concentrated fume from flowing under the helmet.

Dry Grinding

Dust resulting from the grinding of nontoxic metals which are free of sand is generally considered a nuisance and is not harmful *per se*. Despite this fact some state laws require grinding operations to be ventilated. This requirement has probably been a holdover from the days when sandstone wheels were prevalent and also to prevent the creation of a nuisance condition. Grinding wheels in use in industry have artificial abrasives, such as aluminum oxide or silicon carbide. Emery, a natural product composed essentially of aluminum and magnetic oxide of iron, may also be used. A permissible limit of 50 million particles per cubic foot of air for aluminum oxide and silicon carbide was recently accepted by the members of the American Conference of Governmental Industrial Hygienists. Such a limit is liberal and concentrations of such magnitude are normally not encountered.

When lead, silica, or some similar toxic material comes in contact with the grinding wheel the exposure to the abrasive matter may be ignored and the exposure evaluated on the basis of the toxic material. If this latter material is controlled, the nuisance will also be eliminated.

Ventilation systems for grinding wheels have been fairly well standardized and generally are satisfactory to prevent a nuisance. Hoods should enclose the wheel as completely as is practicable. Air volumes should be sufficient to cause an inward flow into the hood when using the smallest wheel. This is especially true where toxic materials are involved.

Wet Grinding

Baffles, hoods, and guards are generally located near wet grinding wheels to prevent dispersion of the liquid used as a coolant. These devices are usually sufficient to control the dust if it is nontoxic in nature. If the dust liberated is toxic, mechanical exhaust ventilation may be required.

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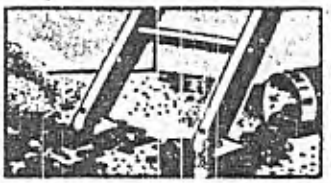


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