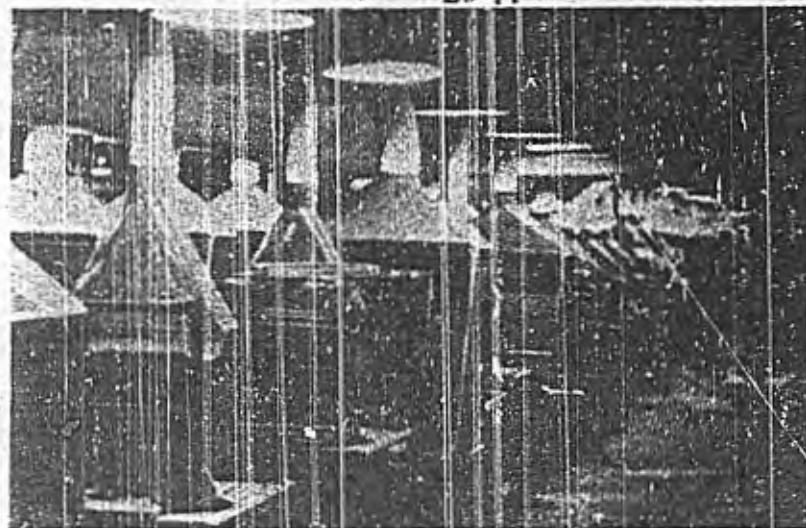


inside and outside views of vapor blasting equipment. Fine silica and water under pressure are used. Cabinets must be maintained so that leakage of mist does not occur.

Local exhaust ventilation of soldering operations.



This discussion will be limited to basic principles of industrial hygiene as they relate to fume and dust exposures, to indicate what control measures are available or used to protect the employee's health, and to call attention to operations and materials which are commonly used in industry, at the same time indicating generally accepted opinion as to their effect on health.

Many conditions are improved for reasons other than their effect upon health. Better products, better employee relationship, reduction in maintenance of equipment may be cited as justification for management's decisions for such correction.

Definitions

Laymen frequently designate as "fume" any vapor, fog, gas, etc., they may encounter. In industry, the plating mist over a chrome tank, the vapor or gases, at a metal-cleaning operation or the exhaust gases from a truck are frequently referred to as "fumes." To the industrial hygienist, the term has a more definite mean-

ing. For this discussion, fume may be considered to be particulate matter formed by the condensation of a vapor. A molten bath of lead at a high temperature causes the metal to volatilize and form a vapor. Upon contact with the cooler surrounding atmosphere condensation occurs and the physical state changes from vapor to a solid metallic particle.

While dust is also a solid particle, it is formed by the disintegration of solid materials by grinding, crushing, abrasion, or similar action.

Fume particles are generally small in diameter, with the size dependent upon the type of fume, the extent of flocculation, and other factors. Dust particles of hygienic significance are those between one and ten microns

in size. (25,400 microns are equivalent to one inch).

Generally speaking, there are two means of entrance of toxic compounds into the human body—by ingestion or via the respiratory tract through inhalation of fumes, dusts, mists or gases. Ingestion is of importance if toxic materials which have a systemic effect are used and adequate washing facilities are not provided, or, where the employees are slovenly in personal habits.

Inhalation is considered the most important portal of entry of fumes or dusts and the particle size, therefore, becomes significant in evaluating exposure. The particles which cause the physiological changes are those which are small enough to remain suspended in the air and not those which immediately fall to the floor. Flying particles, which may cause eye injuries are not of hygienic significance since they are not of respirable size. To judge the seriousness of an exposure by the quantity of detritus adjacent to an operation is often misleading. This is especially true where mechanical ventilation removes the fine material but is inadequate to trap or convey the larger particles.

In evaluating an exposure it is necessary to consider the toxicity of the material, the duration of the exposure, the average concentration of the contaminant with special attention being paid to those operations which produce high concentrations at some phase of an operating cycle, and the measures which have been provided

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