

INDUSTRIAL HYGIENE

The effect of some metals, such as magnesium and zinc, appears to be transient. Only limited data are available on the exotic and rare earth metals.

Although the dusts and fumes from metals with low toxicity do not need as much attention as the dusts and fumes from highly toxic metals, they should not be neglected or disregarded. The metals with low toxicity are more readily controlled because greater amounts can be tolerated, but their dusts and fumes should be kept at reasonable levels since excessive amounts of any of them can be harmful.

Inhalation of the dust of lead compounds is the most common mode of entry of lead into the system, and ingestion of lead compounds can add to the problem if personal hygiene is poor. Workers therefore should be encouraged to wash thoroughly before eating, and lunchrooms should be apart from work areas.

Lead is a normal constituent of plants and animals, and people ingest and excrete it daily even though they are not exposed to lead in their daily work. When intake rates exceed the normal excretion rates, however, lead builds up in the body. When the accumulation reaches a sufficient level, symptoms of poisoning or intoxication appear. The concentration of airborne lead should therefore be kept below the threshold limit because of lead's high toxicity and its tendency to accumulate in the human system.

Beryllium intoxication is a severe systemic disease that can result from the inhalation of the dust or fume of metallic beryllium, beryllium oxide, and soluble beryllium compounds. (There is no evidence of intoxication from the ingestion of insoluble compounds.) Only the inhalation of the beryllium-bearing dusts or fumes produces systemic disease. Accordingly, control of such dusts and fumes to keep them below the concentration specified by ACGIH (American Conference of Governmental Industrial Hygienists) threshold limit values is a basic protective measure.

When the soluble salts of beryllium, especially beryllium fluoride, contact cuts or abrasions on the skin, deep ulcers may be formed which heal very slowly, and complete surgical excision of the ulcer is sometimes required to effect healing.

Metal fume fever is an acute condition caused by a brief high exposure to the fresh-

ly generated fumes of metals such as zinc, magnesium or their oxides. Symptoms appear from 4 to 12 hr after exposure and consist of fever and shaking chills. There is complete recovery usually within one day, and ordinarily the employee can return to the same job without recurrence. However, after a period in which there has been no contact with the fume, for example, after a layoff, resumption of exposure is likely to bring on an attack.

Metal fume fever is caused by heavy concentrations of fumes. Zinc oxide fume is the most common source, but cases caused by the inhalation of fumes from magnesium oxide, copper oxide, and other metallic oxides have also been reported. The condition does not occur from the handling of these oxides in powder form. Apparently, it results only from the inhalation of extremely fine particles freshly formed as fume (called a "nascent fume"). Cadmium, mercury, and other metals may also produce a fever followed by the toxic effects of the element.

Organic Solvents

The widespread industrial use of organic solvents presents a major problem to the industrial hygienist, the safety engineer, and others charged with the responsibility for maintaining a safe, healthful working environment. Getting the job done without hazard to employees or property is dependent upon the proper selection, application, handling and control of solvents and an understanding of their properties.

Labeling

The labeling of solvents to indicate their properties and health and fire hazards is an extremely important method for recognizing and evaluating the hazards. In fact, if a solvent is not properly labeled, it should not be used. The purchasing department can greatly help the safety department by notifying suppliers that only properly labeled solvents will be accepted in the plant.

Uniformity in language and layout is desirable to simplify understanding of solvent use. The MCA's *Guide to Precautionary Labeling of Hazardous Chemicals*, Manual L-1,* recommends the following subject mat-

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