

WORKING

WITH

LEAD

IN

INDUSTRY



U.S. DEPARTMENT OF HEALTH,  
EDUCATION, AND WELFARE

Public Health Service  
Center for Disease Control  
National Institute for Occupational  
Safety and Health

For centuries lead and lead alloys have been in great demand because of their special properties. Lead is a heavy, malleable, soft metal that resists corrosion and is relatively impenetrable by nuclear radiation. It is obtained by mining lead ore, which is principally galena (lead sulfide) and sometimes cerussite (lead carbonate).

The history of lead dates back to ancient Egypt where its use in glazing pottery was a common practice. In Babylon, India, and Rome, lead served a variety of domestic applications, from a base for cosmetics to the base metal for water pipes. In our modern technology, the requirements for lead have multiplied many times, running the gamut of uses from an additive in gasoline to an essential element in nuclear shielding devices. Lead is a necessary constituent in many other important products such as: storage batteries, glass, automobile radiators, conduit and pipe, paints, glazes, solder, printing type metal, ceramics, plastics, bearings, and chemical tank linings.

Unfortunately, the industrial processing of lead presents many situations for workers to accumulate lead in their bodies which may result in lead poisoning. However, lead exposure and the consequences of serious illness can be avoided, and many States have specific legislation relating to the control of lead exposure in industry.

### *How Lead May Affect You*

Most cases of industrial lead poisoning occur through inhalation. Lead dust is introduced into the atmosphere through the grinding and cutting processes of fabrication. Or lead fume can come from heating lead to its molten state as with melting, metal forming,

soldering, or welding processes. Welding steel which is coated with lead paint can produce lead fume. By breathing the dusts or fumes, workers may develop lead poisoning. On a lesser scale, lead poisoning may occur from eating contaminated foods, smoking contaminated tobacco, or the careless handling of objects that have been contaminated with toxic lead compounds. Rarely, a third type of lead poisoning may occur from the absorption of organic lead compounds through the skin.

Lead poisoning may be acute or chronic. The symptoms of acute lead poisoning are experienced by a burning sensation in the mouth, stomach pain, nausea, vomiting, and constipation or diarrhea. Cases showing these symptoms may progress to headaches, muscular cramps, anemia, paralysis, and collapse, possibly resulting in death.

In industry, lead poisoning is more frequently chronic than acute. Traces of lead accumulate in the body over a period of time. Chronic lead poisoning is slow and vague in its beginnings and the signs and symptoms are not well defined. No one symptom indicates the occurrence of lead poisoning. At first, one may experience a general ill-feeling, fatigue, exhaustion, irritability, loss of appetite and weight, vague abdominal discomfort, and a yellow discoloration of the skin. Later there is more often colic and constipation and a disturbance of sleep. Sometimes a blue line on the gum is indicative of lead poisoning and may also result in the premature loss of teeth. In the advanced stages of chronic lead poisoning several body functions and organs such as the liver and kidney may be affected.

## *How Lead Exposure Can Be Controlled*

Effective control to prevent harmful exposure to lead contamination requires an awareness of the potential health hazards and the institution and continuing utilization of effective protective measures. The latter include engineering, processing, environmental, medical, and hygienic protective measures.

For continued exposure protection, an adequate ventilation and exhaust system is a fundamental engineering control. Work areas with high concentrations of lead dust and fumes are usually isolated from other areas, and the dust and fumes are collected at the point of origin by means of a local exhaust ventilation system. The contaminants are vented in a manner so as not to contribute to pollution of the outside air.

Occasionally, situations may arise that require workers to wear respirators for brief periods of time. Because of the continual care and supervision required for their proper and effective use, respirators should be used only as a temporary control measure.

Molten lead gives off noxious fumes of lead and lead oxide. The temperature of molten lead and the exposed surface areas of processing vats relate directly to the amount of lead fumes introduced into the atmosphere. Controls are used to keep molten lead temperature as close as possible to the melting point and to minimize the exposed surface areas of the processing vats by covering non-essential exposed surfaces. This contributes significantly to the lead contamination control effort.

Working conditions are continually monitored as part of a comprehensive

environmental control program. Air samples are taken regularly of all work area atmospheres. The samples are analyzed according to recommended methods to determine the levels of lead in the air, and necessary action is taken to assure that the levels remain within required limits.

A necessary part of any lead control program is the physical examination. This is given before the worker is assigned to areas where there is potential exposure to lead and periodically thereafter. The examination includes blood and urine tests. A history of lead exposure and other medical information is maintained for each worker to insure individual protection.

Good washroom facilities along with locker rooms and showers should be located convenient to the lunchroom. The lunchroom itself is usually situated away from the work area to assure a contamination-free environment.

### *What Effects From Lead Should Be Reported*

Any evidence of disturbance of the digestive system, muscle pain and stiffness in joints, general weakness, weight loss and paleness, should be brought immediately to the attention of the supervisor, nurse, or doctor, depending on plant procedures. The symptom may be easily explained. However, where lead is a part of the work process, it could be a sign of lead exposure. Where a clear and immediate explanation is lacking, the worker is removed from continuing exposure until a medical examination can be made and necessary protective measures taken.

## *Each Worker Must*

1. Have periodic physical examination.
2. Change into special work clothes at work, thoroughly shower after work, and change into street clothes.
3. Wash hands and face thoroughly before eating; never take food, beverages, or tobacco into the work area; brush teeth regularly, and especially after completion of the work shift.
4. Use all safety equipment supplied by the employer such as masks, gloves, and aprons.
5. Avoid alcoholic beverages as alcohol increases lead absorption potential.
6. If ill for any reason, ALWAYS tell your physician that you work with lead and return to work after an illness only upon his approval.

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