

Elements of Industrial Toxicology

so as to produce anhydrous chloric acid should be prevented. It is likely to be spontaneously explosive, as well as highly sensitive to contact with reducing agents.

See *Hygienic Guide*

Sodium cyanide is a white, slightly hygroscopic solid with a reaction sufficiently alkaline to produce a severe dermatitis when the skin is exposed to its dust or its solutions.

Cyanide poisoning in industry is not common. When it does occur, it is usually the result of inhalation of hydrogen cyanide gas, used as a fumigant or produced by contact of one of the metallic cyanides with acid, including carbon dioxide gas and moisture from the atmosphere. See *Hydrogen cyanide*.

The simple metallic cyanides are all extremely toxic if swallowed. For sodium cyanide, the lethal dose is about 9 mg per kg of body weight or about 0.019 oz for a man. Some authorities state that cyanide can be absorbed into the system through the skin or through the lesions of the toxic burn which it produces. This is not, however, a common method of industrial poisoning.

Cyanide prevents oxygen exchange between the tissues and the blood. The symptoms of poisoning are dizziness, headache, a feeling of oppression in the chest, dryness and irritation of the throat, palpitation of the heart, difficult breathing and sometimes vomiting, followed by loss of consciousness and convulsions. A lethal dose produces rapid death and therefore can be counteracted only by *immediate* first aid.

A most effective single first aid measure for this type of internal asphyxia is the supplying of oxygen or oxygen-carbon dioxide mixture for breathing. The person administering first aid should also

- 1 Send for a doctor at once
- 2 Remove the victim to fresh air, without exposing the rescuer to poisoning
- 3 Remove clothing which may contain hydrogen cyanide and wrap the victim in blankets or otherwise keep him warm
- 4 If breathing has stopped, apply artificial respiration
- 5 Supply oxygen or oxygen-carbon dioxide mixture for inhalation
- 6 Permit inhalation of the contents of an

ampule of amyl nitrite, repeat after 15 minutes

- 7 If the victim has swallowed a cyanide compound and is conscious, induce vomiting by giving him a large quantity of tepid water containing an emetic. *Never try to induce vomiting in an unconscious person.*

First aid supplies, as specified by the physician in charge, should be in readiness in all plants where cyanides are used.

Cyanides should be stored and used so that they will not come into contact with acids or be exposed to the air. Where cyanides are used in bulk, men should not be permitted to work alone in an area with an open container.

The layout should provide for ready removal of deposits of dust from the structure and equipment. Dust and vapor incidental to the process should be removed at the source as completely as possible. Local exhaust equipment for this purpose should be designed with special attention to accessibility for cleaning, since hydrolysis of alkali cyanides leaves a deposit of alkali carbonates which form a sticky, tenacious coating on the equipment.

Employees who handle cyanides should be provided with protective clothing which will prevent skin contact with the solid or solution, and appropriate respirators, either canister or supplied atmosphere, should be provided for emergency use.

Sodium dichromate—see *Chromic acid*

Sodium hydroxide—see *Potassium hydroxide*.

Stibine (antimony hydride) is a toxic gas produced by the generation of hydrogen in the presence of elemental antimony. Charging of storage batteries of the lead-acid type produces stibine from the antimony which is in the lead grids as a hardening alloy. This occurs mostly as the battery is overcharged and in increasing amounts as the battery grows older.

Stibine is also apt to be formed when water is applied to the dross from aluminum refining of metals. Its presence and effects in this instance are overshadowed by the arsine also produced.

Relatively little is known about the toxicity