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Dusts and Fumes in Industry

(Sources, Effects and Control)



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Published by

Mine Safety Appliances Company

BRADDOCK, THOMAS AND MEADE STREETS

PITTSBURGH (8) PENNSYLVANIA

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It is to be borne in mind that metals may produce both dusts and fumes, according to the nature of the operation and the state of the materials when processed. For example, among the heavy metals such as lead, dust may be of equal or greater etiologic importance with fumes — other mineral dusts and metallic dusts also are considered of etiological importance, as the following outline will show:

I. Organic dusts:

1. Non-living organic dusts:

- (a) Toxic and/or irritant dusts; "(Various organic compounds such as trinitrotoluene, mercury fulminate, tetryl)."
- (b) allergy-producing dusts (woods, pollens, and the like).

2. Living organic dusts:

- (a) bacteria
- (b) fungi

II. Inorganic dusts: (mineral dusts)

- (a) toxic and/or irritant dusts; (mainly the dusts from heavy metals and their salts, such as arsenic, lead, manganese.)
- (b) fibrosis-producing dusts, (examples are free silica and asbestos).
- (c) non-fibrosis-producing dusts; (the so-called inert dusts, such as alundum, corundum, emery, limestone, magnesite, marble, plaster-of-paris, and polisher's rouge).*

The most important of the non-metallic, inorganic mineral dusts is free silica, which produces silicosis, if breathed in sufficient quantities over a long period of time. Free silica dust and

* This classification is in accordance with the present state of knowledge. Future studies and experience will probably show some of the so-called inert or nuisance dusts to be harmful.

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tions from skin absorption, and it is doubtful that any kind of true fume is absorbed by the skin.

From the etiologic point of view, particularly with reference to pathologic effects, the following outline shows how different types of substances (among the dusts and fumes) act on various systems in the body to produce pathological effects:

1. *General systemic poisoning:*
Examples: Arsenic, lead, manganese, mercury.
2. *Substances acting on the circulatory system:*
Examples: Arsenic, lead, mercury, vanadium.
3. *Substances acting on the respiratory system:*
Examples: Asbestos, free silica.
4. *Substances acting on the gastro-intestinal system:*
Examples: Antimony, cadmium, lead, mercury, zinc.
5. *Substances acting on the skeleton and joints:*
Examples: Lead, mercury, mesothorium, phosphorus, radium.
6. *Substances acting on organs of special sense:*
Examples: Arsenic, lead, manganese, mercury.
7. *Substances acting as fetal poisons:*
Examples: Lead, mercury.
8. *Substances acting on the genito-urinary system:*
Examples: Arsenic, lead, mercury, vanadium.
9. *Substances acting on the brain and nervous system:*
Examples: Arsenic, lead, manganese.

GENERAL DIAGNOSTIC METHODS

The accurate diagnosis of pathological conditions arising from the inhalation of industrial dusts and fumes has tremendous economic significance and also it is of medicolegal importance. Moreover, it is impossible to understand how proper and effica-