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Accident Prevention | Health Conservation | Fire Prevention

Thirty-first Year—The Pioneer Publication in Its Field

Safety Engineering

"The Magazine of Safety"

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ARTHUR C. CARRUTHERS, Editor
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The Very Least an Employer Should Know about Dust and Fume Diseases

By FREDERICK WILLSON, M.D.
President, Willson Products, Inc., Reading, Pa.

THE harm wrought in industry by diseases due to inhalation of dust and fumes is, as yet, not so well recognized as are those visible injuries caused by industrial accidents. Nevertheless, the employer who has at heart the welfare of his workmen and the best monetary interests of his company should wish to have some information on this subject, that he may not err through ignorance of the danger of dust and fumes or of the liability under the law which he must always face.

Although industrial respiratory diseases are not included in Workmen's Compensation Acts in most states, employers are in no sense relieved thereby from their duty and responsibility. Probably one of the most instructive of recent opinions bearing on this subject is that of Judge Cutler sitting in the Supreme Court of the State of New Jersey. Judge Cutler said:

"It was the duty of the defendant company to exercise reasonable care that the place in which it set the deceased at work, and the system or method adopted by it for doing the work, should be reasonably safe for the plaintiff, and free from latent dangers known to the defendant company, or discoverable by an ordinary prudent master, under the circumstances. It was also the duty of the defendant company to exercise reasonable care and skill to provide safe machinery and appliances in which the deceased was employed, and in keeping such machinery and appliances in a reasonably safe condition for such use, including the duty of making inspections and tests at proper intervals while he was so employed. If the defendant failed to perform this duty, and the plaintiff contracted the disease from which he died by reason of such neglect, the plaintiff can recover unless the deceased assumed the risk of his employment, or was guilty of what the law terms contributory negligence."

The above opinion places great stress on "reasonable care" and, of course, no employer can observe reasonable care unless he has at least a little knowledge about the nature of dust and fume hazards.

It may be said, first of all, that large and heavy particles of earthy and metallic matter generally do not constitute a respiratory hazard, because such particles, being large, do not remain in suspension in the air and even when breathed by workmen are almost invariably caught on the mucus membrane of the nasal and pharyngeal passages. Such large particles may unpleasantly dry the secretions, causing the workman to hawk or spit, but the inconvenience occasioned is so marked that the nose and throat are soon cleared of these large particles of dust. In other words, large dust particles continue a source of local irritation instead of lung irritation.

Foreign particles in the air become dangerous to human beings when their mass is so slight that they readily remain in suspension in the atmosphere. Such particles when subjected to measurement generally indicate a size under 5 or 10 microns (a micron equals 1/25,000") and are therefore so minute as separately to be invisible, although when in great concentration such dust can be detected in the atmosphere in the form of a cloud, and in the accumulations of powdery material which settle on everything and everywhere.

Under 5 microns in size dust particles readily pass through the mouth and nose, traverse the bronchial passages and lodge in the alveolar tissue, from which remote parts of the lung structure they cannot be dislodged by hawking or coughing.

Suspended matter in air may come under the classification of fumes as well as dust. Fumes signify, "Liquid or solid particles from 0.2 to 1 micron in diameter formed by physico-chemical reactions such as distillation, condensation and combustion. Acid mists, ammonium chloride, lead, zinc oxide, and the like, can be produced in the form of fumes."

Naturally, the more concentrated the quantity of dust and fume in suspension in the atmosphere the greater the danger to which the workman is exposed and the smaller the particles the greater the likelihood that entrance into the lung interstices will ensue. The size of particles in prolonged suspension in the air is more likely to be under 5 microns than over; probably the most dangerous sort of dust is that ranging from 2 microns to 0.5 micron, or smaller, because, as just stated, these impalpable particles readily remain in suspension in the air. The size of fume particles, as already given, ranges from 1 micron to 0.2 micron in diameter. In other words, the smaller the particles the greater the danger; unaware of this fact employers and workmen

:ially warned, are prone to regard such in- ...ust as altogether harmless.

To the lay mind it seems strange that the human ody reacts so differently to the character of these mi- roscopic particles which find their way into the lungs. Some substances can be inhaled for considerable periods vith comparatively slight physical effect, while other substances even on brief physical exposure tend to start inflammatory processes in the lung tissue, some kinds of which advance progressively, even if exposure ceases, until death results. All types of fine dust containing "free silica" as "quartz" are prone to set up inflammatory processes in the lung tissue, serious conditions which cannot be completely checked when once started and which result in much physical suffering and in premature death. Other dust and fumes entering the lungs may become absorbed into the blood stream and cause general poisoning with symptoms of bodily effect varying according to the toxicity of the substance. Long continued absorption of toxic dust and fumes often results in complete disability, ending in death.

Scientific knowledge of the results of dust exposure has not progressed far enough to exactly predicate the ... f danger in every kind of dust and fume. The ... way for an employer is to regard all dust in industry as a hazard. Under best conditions it cannot help but be harmful to a degree, while under adverse conditions the shortening of life is almost inevitable.

We do know, however, that breathing of dust under the following conditions is seriously harmful:

Lead dust and fumes as found in smelting and burning operations, pottery manufacturing, painting, lead tempering, paint spraying, battery, rubber manufacturing and all other occupations in which lead is an essential material.

Arsenic dust and fumes as in smelting, manufacturing insecticides, spraying of fruit trees, and the like.

All kinds of operations in which dust of free silica is present, as granite cutting, stone crushing, sand pulverizing, sandblasting, the mixing of glass materials and glazes, and so on through a long series of industrial operations.

Asbestos and every operation in which it is used.

Fur cutting and felting (mercury poisoning).

The making and handling of spraying material with nicotine content.

Fumes of zinc and brass, from brass founding, smelting, autogenous welding, and other operations of like character in the presence of zinc. (In this group the results are unpleasant and temporarily incapacitating but not cumulative in effect.)

Besides the above operations, unpleasant results may follow exposure to such dusty conditions as cleaning of factory floors and walls in the presence of germ laden dust; threshing and cleaning of grain, and numberless other operations tending to introduce into the human system irritating and poisonous material.

Cooperation Between Employer and Employee

A REMARKABLE event has recently taken place at Endicott, New York, where 40,000 persons marched and 150,000 persons viewed the parade in celebration of fifty years' development of the Endicott Johnson Corporation, manufacturers of shoes.

George F. Johnson fifty years before located in Endicott with no other assets than health, youth and ambition to begin work at the bench in a small shoe factory. Today Mr. Johnson is chairman of the board of the Endicott Johnson Corporation which employs 17,000 workers with a productive capacity of 135,000 pairs of shoes per day and running at capacity at a time when practically the whole world is in the depths of an economic depression. This "Golden Jubilee" celebration of the Endicott Johnson workers was honoring George F... on. The whole community joined in the celebra...

Mr. Johnson has always considered himself as one of the Endicott Johnson associate workers. He has been the pilot in this great organization and has been not only untiring in advancing the Endicott Johnson Corporation to a ...

Secretary of Labor Doak, United States Senator Wagner, Congressman John D. Clark and many other distinguished citizens were present and expressed their admiration for what George F. Johnson's life has represented as a great industrial builder, as a great humanitarian, and in maintaining prosperity and happiness to many thousands of families.

This is the type of industrial leadership which any company or community is fortunate to possess, the type that does not fail and even in the hardest times of business depression keep the working force employed and safeguards the community from the suffering of unemployment.

Old Man Accident Says:

"With Carefulness, I Cannot Succeed; with Carelessness I Cannot Fail"