

INDUSTRIAL MEDICINE MEETS THE VETERAN INDUSTRIAL
HYGIENE

Talk given by W. J. McConnell at the Fourth
Postgraduate Course in Industrial Medicine
at the Long Island College of Medicine,
Brooklyn, N. Y. on January 15, 1946.

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INDUSTRIAL HYGIENE

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Industrial hygiene may be defined as that branch of the medical, nursing, chemical, and engineering sciences which is concerned with the study of the effects of environmental conditions in industry upon the health of industrial workers, and with measures for eliminating or controlling the causes and thus preventing or modifying the effects.

A well planned and conducted industrial hygiene program helps industrial management to carry on the company's business without damage to the health of the working force and aims at rendering industrial life healthy, safe, and efficient. It results in better employer-employee relations, and in the prevention of occupational illnesses through proper control over the industrial environment.

In appraising the plant environmental factors injurious to health, it is necessary to determine the extent of the average industrial exposure resulting from the raw materials used, from the manufacturing processes giving rise to toxic gases, fumes, and dusts, and from the intermediate and finished products formed during each phase of the operation.

Much progress has been made during the past twenty-five years in the development of new methods and new tools for determining industrial exposures.

The development in 1922 of the Greenburg-Smith Impinger gave us for the first time a standard instrument for the collection of dusts. The underlying principle of this device is based on impingement and wetting of the dust particles by drawing air through a tube at high velocity against a glass plate immersed in an absorption medium.

The dust particles are trapped in the liquid. The United States Public Health Service established permissible limits of dustiness on the basis of the results obtained with this device in correlation with medical studies.

A smaller instrument, known as the midget impinger, which is identical in principle with the impinger was developed in 1936 by the U. S. Bureau of Mines, and has certain advantages as well as disadvantages over the standard instrument. Improvements have been made also in microprojector methods for counting and measuring the size of dust particles.

A filter paper method for obtaining dust concentrations has been suggested recently by G. E. Brown of the U. S. Bureau of Mines. It differs from the impinger method mainly in that the dust is removed from the air by drawing the air, with a hand-operated pump, through a special lintless, high-wet-strength, hardened filter paper. The dust is removed from the filter paper by shaking in a dust-free liquid. Counting is done by the same procedure used for impinger samples. Results comparable to those of the impinger are obtained.

A number of direct-reading instruments have been designed to determine whether a health or fire hazard exists in confined spaces where flammable vapor or solvent mixtures may collect. Combustible gas detectors and indicators are available for adequately determining vapor-air mixtures for explosibility. An estimate of concentrations of total solvent mixtures in the atmosphere of an industrial environment can be made by a gas interferometer. A portable type is available for field work.

A variety of methods and devices have been developed for the detection and measurement of carbon monoxide gas in the atmosphere. Some of the instruments available are designed to continuously indicate carbon monoxide concentrations in air.

Another very useful instrument for field work is the vapor detector which is primarily designed to indicate mercury-vapor concentrations. It can also be used to

indicate other vapors, such as benzene and pyridine, which absorb ultraviolet light. The estimation is made photoelectrically and gives a direct reading of the mercury vapor concentration in the air.

With the industrial application of roentgen rays and radium, a number of devices have been perfected for recording stray radiations in work areas.

Similar advancement has been made in the development and application of appropriate control measures for harmful industrial exposures. The choice of the measure used depends upon the circumstances giving rise to the hazard in each individual process. Usually a combination of measures must be employed to insure success.

In general, preventive measures include the substitution of harmless or less harmful substances for harmful ones; the segregation or isolation of processes which produce contamination; enclosure of processes or sources of contamination; local exhaust ventilation and increased general ventilation; wet methods for dry; protective respiratory devices; good housekeeping, shop education; and medical supervision.

The determinations made from time to time of safe concentrations for various toxic atmospheric contaminants, and the publication of the results, by the American Standards Association and other organizations, serve as a useful guide in evaluating the adequacy of, ^{or} need for, additional control measures.

The frequent published listing of all respiratory protective devices that have obtained official certification of approval from the U. S. Bureau of Mines aids in the selection of equipment which has passed the tests for safety, practicability, and efficiency required.

Research work, both in the laboratory and in the industrial plants, have been a continuous source of new information for evaluating and controlling industrial health hazards. The practical application of new methods and new tools depends largely, however, upon the training and experience of those who use them. The rapidity at which

the field of industrial hygiene has expanded during recent years has practically exhausted the number of available trained personnel required for industrial hygiene work. The need for personnel is great and the opportunities are many.

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