

FILE NAME: Baldwin (BALD)

DATE: 1947 Oct

DOC#: BALD074

DOCUMENT DESCRIPTION: Journal Article - Industrial Hygiene in Ohio

Industrial Hygiene in Ohio*

By THOMAS F. MANCUSO, M. D.

Chief, Industrial Hygiene Division,
Ohio Department of Health

FOR many years the public health approach has accentuated the application of health principles through a school health program. The noticeable drop in communicable disease and the corresponding decrease in the morbidity and mortality rates amongst school-age groups has been progressive and is due mainly to the school health program. Similarly, in industry the application of principles of prevention can reduce the morbidity and mortality rates of our industrial population.

In 1945, there were over 2,300,000 individuals employed in 164,000 manufacturing and trade units in the State of Ohio. When we realize that there are over 1,100 causes of industrial diseases, and that the morbidity and mortality rates are high in the industrial groups, we are brought to the observation that the loss of health is tremendous. If we take into consideration the fact that one-third of each 24 hours, or one-half the time during which they are awake the industrial population is grouped together under environments and conditions which are controllable, we can readily appreciate the improvements in community health possible through an effective industrial hygiene program.

To provide the health protection necessary to our industrial population the Public Health Council adopted on February 16, 1946, regulations to prevent and control diseases resulting from exposure to toxic fumes, vapors, mists, gases and dusts. These regulations became effective January 1, 1947, as part of the Ohio Sanitary Code with the effect of law.

We have received many inquiries about these regulations concerning their application, administration, enforcement, and the concentration limits of the toxic substances listed. Before discussing these sections I should like to give you a brief

background of the development of Industrial Hygiene in the State of Ohio. Actually, the history of Industrial Hygiene activities in Ohio dates back over a half century.

The importance of maintaining the health of the workers in Ohio was recognized as early as 1886 when Dr. John D. Jones, of Cincinnati, gave a report, "The Effect of Occupation upon the Health of Individuals." It discussed dangers encountered by lead workers, barrel fillers, file cutters, saw makers, tool makers, wool and cotton makers and employees in gas works. In 1910, the State Bureau of Vital Statistics published annual tables of occupations against causes of death. These tables were continued until 1914. In 1912, the Industrial Commission was created and the enforcement functions of industrial safety was administered by the Department of Factory Inspection. In 1913, the legislature of the State of Ohio passed two bills of importance to the progress of industrial hygiene. The first of these—House Joint Resolution No. 12, authorized and directed the State Board of Health to make an investigation of occupational diseases and hygiene. The resolution was as follows:

WHEREAS, the employment of men and women in certain occupations is known to be attended with more than ordinary danger to health, giving rise to what is known as "occupational diseases," and whereas, unnecessary sickness and shortening of life from whatever cause is a serious loss and of grave concern to the State and to all the people, and whereas, it is known to be possible by public education and by the enforcement of proper measures to largely prevent unnecessary sickness and premature death among employees in various trades and occupations, therefore, be it

Resolved, by the General Assembly of the State of Ohio, that the State Board of Health, is hereby authorized and

* Address given at our Industrial Section Meeting of our Annual Convention, June 6th, 1947.

directed, to make a thorough investigation of the effect of occupations upon the health of those engaged therein with special reference to dust and dangerous chemicals and gases, to insufficient ventilation and lighting, and to such other unhygienic conditions as in the opinion of said board may be specially injurious to health, and to report to the next General Assembly the results of such investigation, with such recommendations for legislation or other remedial measures as it may deem proper and advisable.

A sum of \$7,000,000 a year was appropriated for two years for this purpose. In the same year the legislature passed an act requiring the reporting of occupational diseases to the State Board of Health by every physician attending, or called upon to visit, a patient whom he believed to be suffering from occupational poisonings. Concurrent with these activities of the Department of Health, the Industrial Commission was devising various safety codes for factories, workshops, foundries, potteries, metal and wood working industries, elevators, etc.

In 1921, by legislative act, a schedule of diseases to be compensated similar to industrial accidents was passed. This was based upon the accumulation of experience regarding occupational diseases by the Department of Health. The legislature also empowered the Industrial Commission to investigate and ascertain the hazards productive of the 15 diseases specified.

In the 1929 and 1937 sessions of the state legislature, provisions were made for inclusion of other occupational diseases to be compensated, and finally in 1939-1940 all other occupational diseases were added to provide complete compensation coverage.

In 1940, the Department of Health conducted an industrial survey of the State of Ohio of some 2,901 industries with a total population of 300,624. An evaluation was made to determine the toxic substances to which workers were exposed and what control measures were provided.

The Ohio Department of Health in 1945 sought and obtained an opinion from the Attorney General to determine whether the Public Health Council had the authority to establish maximum

concentrations for substances dangerous to the public health. The Attorney General ruled as follows:

"Accordingly, it is my opinion that nothing in the laws relating either to the Industrial Commission or the Industrial Relations, in any manner prohibits or limits the powers of the Department of Health through its Public Health Council in enacting penal regulations of a general character designed to preserve and protect the public health, and in extending such regulations to cover occupational diseases."

"I do not, of course, undertake to pass upon the technical accuracy or reasonableness of the regulations which you propose, but it is my opinion that it is within the powers given by law to the Public Health Council to adopt a regulation of the character proposed."

On February 16, 1946, the Public Health Council adopted the regulations mentioned which became effective January 1, 1947.

Now, I should like to discuss the salient features of these regulations. First, their purpose is the prevention and control of diseases which may result from exposure to toxic fumes, vapors, mists, gases and dusts. Second, their application is all inclusive to all places of employment whether it be an office building, manufacturing industry, or non-manufacturing industry; that is, wherever diseases may result from such harmful exposure.

In the preparation of these regulations it was realized that in some instances modifications may become necessary and, with this thought in mind, Regulation 245 was written as follows:

"(MODIFICATIONS.) When strict compliance with all of the provisions of these regulations would involve undue hardships, the Ohio Department of Health may, upon application in writing, permit modification of the requirements when protection practically equivalent to that required by these regulations has been provided. The application for the modification of any of these regulations in any particular case shall be accompanied by a full statement of the existing conditions and the reasons for requesting such modification."

It is apparent that the inclusion of the Regulation on Modifications will accomplish the purpose of health protection and at the same time encourage and require industry to provide minimum requirements.

Regulation 247, on harmful exposures, is perhaps the most significant section of the code. It states:

- "(1). No employer shall use or permit to be used in the conduct of his business, manufacturing establishment or other place of employment, any process, material or condition known to have an adverse effect on health, unless reasonable provisions have been made to prevent injury to the health of the employees and of the public.
- "(2). The concentration of dusts, fumes, mists, vapors, or gases in the air breathed by employees shall not exceed the following maximum allowable concentrations for an 8-hour day exposure."

This list includes certain toxic chemicals and states the concentrations in parts per million at which level these substances would constitute a harmful exposure. Besides the chemicals, the metallic dusts and mineral dusts are listed with their maximum concentrations. Limits on other dusts and fumes and radiation are also stipulated. In the preparation of this table the substances and concentrations listed were confined to those in which sufficient scientific and medical data warranted their inclusion as substances which would result in harmful exposure.

We are aware that there are many other substances not listed which are thought to be injurious to health, but of these additional data will be required before consideration can be given for inclusion or amendment of this section. Amendments may be made by the Public Health Council, after public hearing, whenever sufficient future research and medical knowledge reveal that the substance or the concentrations should be revised.

The regulations subsequent to 247 state the minimum requirements necessary to accomplish the purpose of reducing the concentration of these toxic fumes, mists, vapors, gases and dusts below the stipulated maximum allowable

concentrations, through general and local exhaust ventilation, the isolation of hazardous operations, the provision of personal protective equipment, and the warning of health hazards.

We do feel that information concerning the health hazards to which a worker is exposed should be made known to him as well as the means to protect himself from such harmful exposure. Regulation 254 states:

"(WARNING OF HEALTH HAZARDS.)

In all places of employment where harmful exposures exist from infective agents in materials used from toxic dusts, fumes, mists, vapors, gases, or from heat, radiation, humidity, radioactive material or any other injurious substance or cause, the employer shall call attention to such hazards and shall periodically instruct all employees regarding the harmful exposures connected with their duties and the best preventive measures and methods to protect themselves therefrom."

The proper application of this regulation will frequently prevent the occurrence of many diseases which would otherwise result from the lack of such information. The policy of the Division of Industrial Hygiene in the administration of these regulations will be one of "cooperation and service." It is the desire of the Department of Health to be of assistance to all industry in the evaluation and control of potential and actual health hazards. We have no intentions of requesting that industry install ventilation equipment of certain physical dimensions but rather that the result obtained shall remove the dusts, gases, mists, fumes, or vapors from the working environment below the level that would constitute a harmful exposure. The emphasis is placed on prevention and control and the methods necessary to accomplish this.

To further this purpose the Ohio Industrial Hygiene Division has instituted a three-point program, namely:

1. Prevention and control of occupational diseases and industrial public health hazards.
2. Coordination of official health services in industry.
3. Extension of industrial health education.

The prevention and control of occupational diseases and industrial public

health hazards is the first phase of our program because it is the focal point of all the activities of the Division. The effectiveness and extent of occupational disease control is dependent upon statewide case finding. In the majority of the states the physicians report cases of occupational diseases directly to the State Health Departments. Such is the case in Ohio. Further reports are received from field representatives of state and local agencies such as county sanitarians, local health departments and voluntary health agencies. Also instrumental in bringing cases to our attention are the industrial nurses, safety engineers, and local physicians. Other sources of case finding are revealed through requests for information pertaining to potential health hazards. These requests may be from management and labor, any group or organization, and any member of the public. In the majority of instances these studies will also reveal other potential hazards which may produce occupational diseases. Self-initiated studies are another very significant source of case finding. These may be applied to a particular industry, occupation or toxic substance. News reports, state vital statistics, and mortality data of the industrial population as released through hospital and sick benefit associations and plant medical departments present another case finding source.

The information obtained through all these case finding sources furnishes the division with the basic data for occupational disease control. This data enables the personnel of the division to conduct field investigations for the physical and chemical determinations of the working environment. Through these field investigations the toxic substances which produce the occupational disease are ascertained and methods are recommended for their prevention and control.

Field investigations may be of various types. An industrial hygiene study comprises an evaluation of the manufacturing materials and processes; atmospheric determinations for dusts, fumes, mists, vapors, or gases; measurements of illumination and ventilation; analysis of the chemical composition of materials and processes to which the worker is exposed; evaluation of medical and nursing services; industrial sanitary facilities; protective measures; and industrial toxicology.

An industrial hygiene survey comprises

an investigation of the working environment throughout the plant for the observation of potential health hazards and materials or processes used, but does not include the chemical determination of dusts, fumes, vapors, mists, or gases of the toxic substances.

An industrial hygiene plant visit may be confined to an inspection of one particular department or operation for the visual determination and evaluation of the working environment. For each type of investigation a report is submitted to the company presenting the findings of the investigation with the recommendations for the prevention and control of occupational diseases and potential health hazards.

In each instance of a reported case of occupational disease there are specific medical and engineering control measures which can prevent the occurrence of additional cases and can control the extent of the toxic exposures. These preventive and control measures vary with the operative processes and the toxic substance or material. In general, the engineering control follows the principles of isolation of the hazard, substitution of less toxic material, local exhaust ventilation at the source of contamination, and change in operative processes.

The medical control measures are primarily concerned with the determination of the causes of the occupational diseases and industrial public health hazards and establishing the means for their prevention and control. Personal protective equipment and clothing, personal hygiene, sanitary facilities, plant medical and nursing services, promotion of preplacement physical examinations, and health education are some of the supplementary control measures.

In each case the engineering and medical control measures are designed for the specific process or operation or material under observation. Even in the same industry the application of these control measures varies considerably according to the plant size, physical layout of equipment, processes, and the extent of the toxic exposures.

The second point in the industrial hygiene program is the coordination of official health services in industry. Here we are concerned with the application of the principles and services of the state divisions of Maternal and Child Hygiene, Sanitary Engineering, Nutrition, etc., and

the control of communicable diseases, particularly of tuberculosis and venereal diseases.

The Industrial Hygiene Division has direct correlation with the activities of the Division of Maternal and Child Health, through the instigation of occupational disease control measures for the protection of women in industry. This is of particular significance because of the susceptibility of women to certain toxic substances.

The activities of the Division in the investigation of the various industries and the manufacturing processes and materials furnish a case finding source for the Division of Sanitary Engineering in the referral of potential problems due to industrial wastes, cross connections, sewerage disposal, etc.

In regard to nutrition the Division promotes in-plant feeding in industries as a factor in the maintenance of health and the prevention of illness. Likewise, the Division indirectly assists the State Rehabilitation program by providing technical assistance for the quantitative and qualitative analyses of toxic fumes, mists, vapors, gases or dusts to which a physically limited or handicapped worker may be exposed. Such technical evaluation of the working environment is necessary to prevent further health injury which may result from harmful exposure.

In the coordination of the control of tuberculosis in industry the Division of Industrial Hygiene promotes mass chest X-rays in preplacement and periodic medical examinations.

For venereal disease control in industry the Division cooperates in the development of a case finding procedure through the promotion of blood tests in preplacement physical examinations. In the case of workers who have contracted communicable diseases, the Division may be called upon to advise in regard to safe employment of such individuals.

"The National Advisory Committee on the Control of Venereal Diseases has stated that there is no reason for denying employment to an applicant or for discharging an employee because an examination has revealed evidence of syphilis or gonorrhea, provided:

1. That the employee agrees to take such treatment as may be indicated.

2. That, if the stage of the disease is infectious, employment should be delayed or interrupted until such time as a non-infectious stage is established through treatment, and open lesions are healed.
3. That employment should not be delayed or interrupted when syphilis exists in a latent stage.
4. That employment may be deferred or denied only when disabling manifestations exist which would render such individuals industrial hazards to themselves, other employees, or to the public.
5. That provision be made, whenever possible, for occupational readjustments of employees who develop disabling manifestations that do not incapacitate them from performing some type of useful work.
6. That workers with syphilis in any of its stages, regardless of past or present treatment status, should be excluded from areas of toxic exposure, and that those having cardiovascular physical exertion, or abnormal atmospheric pressure.*"

The coordination of state health activities is extended also to the local and county health departments. Assistance is given in the correction of health hazards in the industries of any particular area and in the promotion of health projects of the local and county health programs. The Division furnishes the local county health department with general data or information pertaining to health hazards in industry and welcomes participation in investigations and studies made in plants in their areas.

The third point of the state industrial hygiene program is the extension of industrial health education. To fulfill this purpose various approaches are used. Foremost among these is the preparation of material pertaining to occupational disease control to be distributed to plant publications for the industrial population; the presentation of talks and lectures before groups of medical and nursing students, non-professional groups and manufacturing and labor organizations; and the provision of in-service training for medical, nursing, and engineering personnel interested in the field of

* Industrial Medicine Magazine, 11:507-510 1942.

industrial health. The introduction of courses in local educational institutions such as high schools, apprenticeship training, etc., also provides a further means of the extension of industrial health education.

The need for industrial health information, particularly to the man who works, is reflected in the data and percentage of the reports received by the Ohio Department of Health. It is my considered opinion that not more than 10% of the occupational diseases which do occur are reported. This is due to the lack of knowledge as to what constitutes an occupational disease, the causes of such diseases, and the manner in which they occur.

In order to render the necessary technical industrial hygiene services, the activities of the State Division of Industrial Hygiene has been completely decentralized. Services to the local industries are rendered through District Offices staffed with Industrial Hygiene Engineers and such technical assistance as necessary for each District Office to operate as an autonomous unit. This provides for closer coordination with the various county and local health departments.

In general, the District Offices have been set up in relation to the industrial concentration of the area. At present, District Offices have been established in

Middletown, Youngstown, and Norwalk, to provide industrial hygiene services for the southwestern, northeastern and north-central areas. It is hoped that other District Offices with headquarters in Toledo and Columbus will be established to provide similar services for the northwestern and southeastern sections of the state. A central administrative and consultant unit comprises the State Division of Industrial Hygiene.

The industrial population in Ohio through its payrolls and expenditures, and industry through its capital, equipment, manufacture and sales form the backbone of the economy and prosperity of the state. The financial loss that occurs to industry through absenteeism, illness, labor turnover, and compensation costs is tremendous. It is estimated that should one wish to determine the approximate annual absenteeism loss in any industrial group, the number of workers should be multiplied by \$70.00 per year. In the State of Ohio the loss would be approximately \$150,000,000 per annum. This represents the annual loss to industry and the industrial population. It also represents approximately the amount that could be saved each year through an adequate industrial hygiene program.

In short, "the health of the industrial worker forms an integral and inseparable part of the health and wealth of the community."