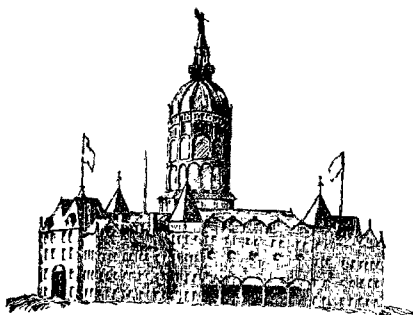


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CONTROL OF DUST EXPOSURES IN CONNECTICUT

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Exposure to dust of the type which produces pneumoconiosis presents the most serious single occupational disease hazard in the state. The Bureau of Occupational Diseases, early in its existence, classified Connecticut industry and listed the potential health hazards which may occur in each. Of the 96 industrial classifications, 41 were found to include such dust exposures.

Based on a general knowledge of the dust problem, surveys were conducted in plants presenting the most important problems in point of severity and of number of workers exposed. Dust determinations were made of operations and equipment which contributed to the dust content of the working environment. From this work much fundamental information was obtained on the dust exposures in the industries of the state, and dust control measures were instituted where necessary.

Factors in Pneumoconiosis

Four factors determine whether a dust exposure may produce pneumoconiosis: (1) the particle size, (2) the composition of the dust, both chemical and mineralogical, (3) the concentration of the dust in the air, and (4) the duration of exposure.

In order for dust to enter the inner recesses of the lungs and produce this disease, it must be smaller than 10 microns ($1/2500$ inch) in its longest dimension. In fact, most of the dust found in the alveoli of the lungs is less than 5 microns in size, though asbestos dust seems to be an exception as fibers even 300 microns in length penetrate into this portion of the lungs.

The dust which causes development of silicosis, a type of pneumoconiosis, on shortest exposure is that containing high percentages of free silica in the form of quartz. A number of exceptionally rapid cases have resulted where alkaline dust has been mixed with the quartz, but this is a comparatively limited exposure. Certain other types of dusts than those of high free silica content may cause fibrosis of sufficient extent to lead to disability. Asbestos, which contains but little free silica, is an example of such a dust.

In general, the concentration of dust necessary to cause silicosis is dependent upon its content of free silica. Extensive investigations of the effect of various concentrations of granite dust, for example, indicate that this dust hazard is well under control if the atmospheric concentration is less than 9 million particles per cubic foot.

The duration of exposure required to produce disabling silicosis depends on the type of dust and the concentration breathed. It usually requires several years even under the most severe conditions.

To determine the extent of potential dust hazards in the causation of silicosis, these four factors must be considered. This requires more than cursory inspection. Furthermore, control measures which are to be instituted must be based both on a general knowledge of these four factors and on specific information concerning them found at the particular operation or plant being investigated.

Dust Surveys By the Bureau

During the last few years, the dust problem has assumed such importance that the dust control activities of the bureau have greatly increased. As an indication of the diversity of dust exposures investigated by the bureau, fifty-four different types of industries or operations have been surveyed.

In the fiscal year ending June 1936, in addition to the many demands placed on the bureau for a wide variety of services in relation to hazardous conditions in industry, some eighty-three surveys were made of dust exposures alone. In the present year, with somewhat augmented personnel, the number of dust surveys will be more than doubled.

The survey of the foundry industry in the state which is at present in progress is an example of the operating procedure of the bureau. Briefly, the bureau first conducted a number of complete studies of foundry dust conditions in order to become thoroughly familiar with the extent of the dust exposures presented by specific operations and types of equipment. The conduct of such studies has been extended over the last three or four years.

Plans were then made for a complete survey of the entire foundry industry. A list was compiled of all foundries in the state, both those operating as the principal part of the business and also those which are merely one department in connection with other manufacturing operations. Forms were prepared containing items on materials, equipment, operations and general conditions which contributed to the dust exposure. This form was predicated upon an extensive knowledge of the industry and its dust problem.

Since dust control in the foundry industry is primarily a matter of provision of dust collection equipment, institution of good house-keeping measures, provision of adequate ventilation, affording proper respiratory protection and the like—all measures which come under the responsibility of management—it was considered desirable to discuss the bureau's program with the foundrymen of the state. The three-fold purpose of this survey was outlined before a meeting of this group as follows: (1) to obtain complete information of dust conditions in this industry, (2) to conduct an intensive educational program concerning the dust problem, and (3) to control the dust conditions which present health hazards.

At the present time more than half the foundries of the state have been completely surveyed. In addition to obtaining the facts included in the survey form, the representatives of this bureau have thoroughly discussed the silicosis problem at each of the foundries surveyed and have pointed out those excessive dust exposures which are evident on general observation. Recommendations for control of such conditions are presented at the time of the survey.

At the conclusion of the foundry survey the facts secured will be used for the development of adequate control measures. The most practicable control measures for each individual operation can then be applied to the end that the dust problem in this industry will be met as rapidly and economically as possible. It is an encouraging note that even before the completion of this survey, there is much activity among the foundries in clearing up dusty conditions which have been disclosed during the course of the survey.

In addition to necessary investigations of health hazards in particular plants which the bureau must conduct as a part of its regular program, surveys of other entire industries involving dust exposures will be undertaken. It is anticipated that such an orderly, well balanced procedure will continue to be effective in the further control of dust problems encountered in Connecticut.

POPULATIONS STATE, COUNTIES AND TOWNS, AS OF JULY 1, 1936

For many years the so-called "Arithmetic Method" has been used in Connecticut for estimating the population. This method assumes that any increase or decrease between two census dates, reduced to an annual increase or decrease, is projected forward by the annual amount from year to year until the next census. This is called "extrapolation".

This is the method finally decided upon for estimating the populations for 1936; but as another method of estimation has been studied, and which yielded some interesting results, a brief discussion of this other method is given.

According to legislation passed at the 1935 session of the General Assembly relating to assistance for the aged, a list of all persons between the ages of twenty-one and sixty, inclusive, residing in each town on the first day of October, shall be prepared each year and lodged in the office of the town clerk. These lists, and the numbers indicated thereby, were studied as a method of population estimation. The procedure is described below for the state as a whole.

1930 Census, April 1, Connecticut Total Population	1,606,903
Ages 21-60	834,222
Age Group 21-60, as Per Cent of Total	51.9149

It is now assumed that this per cent has remained constant since 1930 and is true in 1935. Referring now to the numbers reported in the tax lists, this number was 894,231. This number is 51.9149 per cent of 1,722,494, which might be considered as the population estimate not for 1935, but for 1936, as the tax lists for 1935 receive additions up to April, 1936. The arithmetic method gives 1,722,797 as the estimated population for 1935. This is only 303 more than the tax list enumeration. It remains to show why this should be carried over as the 1936 estimate.

After the census of 1920 was taken, it was necessary to estimate populations up to 1930. When the census of 1930 was taken it was a simple matter to discover the error in the estimate. The table below sets this forth:

Estimated Populations, 1920-1930, as of July 1, in Each Year

Annual Increase	27,439
1926	1,558,996
1927	1,586,435
1928	1,613,874
1929	1,641,313
1930	1,668,752
Subtract two annual increases	54,878
	1,613,874

Actual census of 1930, as of July 1, 1930, 1,613,422.