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MEDICOLEGAL PHASES OF OCCUPATIONAL DISEASES

An Outline of Theory and Practice

by

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CHAPTER II.

STANDARDS OF PERMISSIBLE EXPOSURES

IN THE study of the working environment, and the evaluation of industrial exposures, it becomes necessary to have some standards of permissible exposures which can be used as a guide. Heretofore there have been certain comparative figures, some of which have been accepted quite generally and others which have a wider range of flexibility. The determination of industrial exposures and their evaluation rests mainly upon judgment and experience as applied to the use of the generally accepted standards. It is always a matter of careful interpretation, based on critical discrimination and wide acquaintanceship with these problems.

The sources of the data are not many, being derived very largely from research work by the U. S. Bureau of Mines and individual investigators--and originally compiled by Henderson and Haggard in 1927.¹ Some additions and changes have been made since these original figures.

Sometimes these figures have formed the basis for provisions in state codes, especially with reference to the protection of exposed workmen. In such instances, they have been modified or adjusted to be suitable for use in the states preparing such codes, or have perhaps been changed to meet the ideas and opinions of the personnel of the committees formulating the codes.

With reference to dust concentrations, which should always be considered along with the percentage of free silica in the dust, the Committee on the Prevention of Silicosis through Medical Control, of the National Sili-

cosis Conference in its summary report² has published the following data as having been accepted as permissible for particular industries in the localities indicated:

TABLE I
PERMISSIBLE DUST CONCENTRATIONS
IN VARIOUS INDUSTRIES

Industry	Percentage Silica in the Dust	Permissible Maximum Safe Dust Concentra- tion—Millions per Cubic Foot
South Africa (1)	80	4½
Ontario gold mines (1)	About 35 (in the rock)	8½
Australia sandstone (1)	90 (in the rock)	6
Barre granite (2)	31 to 38	10-20
Pennsylvania anthracite coal mines (2)	35	5-10
	13	10-15
	5	50
Broken Hill, Australia (1)	10 to 17	14
(1 — Based upon engineering practice)		
(2 — Based upon clinical studies)		

As an example of the state codes concerning dust requirements, the New York State Department of Labor's rock-drilling code may be cited.³ This was adopted on May 1, 1937, and provides for two classes of rock-drilling requirements:

In Class I, while drilling rock formations containing less than 10 per cent free silica by weight, dust concentrations must be below 100 million particles per cubic foot of air;

In Class II, where the drilling is in rock formations containing more than 10 per cent free silica by weight, the concentration of dust must be kept below 10 million particles per cubic foot of air.

The Industrial Accident Commission of the State of California has recommended that the following limiting concentrations be used as a basis in determining the existence of a health hazard in places of employment:

issued Dec. 1936 (p. 76)

TABLE II

Material	Concentration
Benzene (Benzol)	100 parts per million
Carbon Tetrachloride	100 parts per million
Carbon Monoxide	100 parts per million
Chlorine	1 part per million
Chromic Acid	1 mg. per 10 cubic meters
Formaldehyde	20 parts per million
Gasoline	1000 parts per million
Hydrogen Cyanide	20 parts per million
Hydrogen Chloride	10 parts per million
Hydrogen Fluoride	3 parts per million
Hydrogen Sulphide	50 parts per million
Lead	1.5 mgs. per 10 cubic meters
Methanol	100 parts per million
Nitrogen Oxides	40 parts per million
Phosgene	1 part per million
Sulphur Dioxide	10 parts per million
Turpentine	700 parts per million
Silica (free silica)	10 million particles, of a size between 0.5 and 5 microns, per cubic foot of air.
Asbestos	10 million particles, of a size between 0.5 and 10 microns, per cubic foot of air.
Dusts (other than silica, asbestos, and those of a toxic nature)	50 million particles, of a size between 0.5 and 5 microns, per cubic foot of air.

Allowable concentrations of the following substances have been derived from miscellaneous sources:

TABLE III

Material	Concentration
Ammonia	50 parts per million
Aniline	5 parts per million
Arsine	30 parts per million
Carbon bisulphide	20 parts per million
Chloroform	100 parts per million
Ethylene dichloride	100 parts per million
Mercury	2 mgs. per 10 cubic meters
Naphtha (coal tar)	100 parts per million
Tetrachlorethane	10 parts per million
Tetrachlorethylene	200 parts per million
Toluol	200 parts per million
Trichlorethylene	200 parts per million
Xylol	100 parts per million
Zinc oxide fumes	140 mgs. per 10 cubic meters