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DUST *in* INDUSTRY

Shop Methods and Equipment Effective in Controlling Dust Hazards

By FREDERICK WILLSON, M.D.[1]

JUST at this time employers in dusty trades find themselves in a difficult, if not alarming, position. Not fully warned or informed, until lately, of the special dangers of certain dusts, employers have naturally exercised merely general care in dust prevention.

Under such "general care" some of their workmen—those exposed to silica, and siliceous, dusts—have been found to be suffering (if indeed some have not died) from the physical condition now recognized as "silicosis," either with or without tubercular complication.

At the present day except in some half-dozen states, occupational dust diseases are not included as compensatable under employers' liability laws, hence workmen or their families seeking redress for alleged physical damage must bring such action under the common law. The consequence is that employers in certain kinds of dusty trades are now threatened with much litigation and some monetary loss.

To any one not familiar with the exact situation in industry, it may seem strange that employers did not act years ago to attempt a better control of the silica-dust hazard. This undoubtedly would have been done by most employers if they had been aware of the danger, but unfortunately the subject, although under investigation and fairly well understood in scientific circles, was largely unknown to industry. Dust to employers was merely "dust"—one kind being thought to be as dangerous as another—although, of course, we know today that this is not the case. Most well-intentioned employers may be said to have used "reasonable care" in past years, and this "reasonable care," considering their lack of knowledge, is now their best defense in the damage suits just referred to. However, from now on, with the spread of common, or at least available, knowledge of the peculiar danger of certain dusts, only "special care" will safeguard the interests of employer and workman alike.

PRECAUTIONS NECESSARY WHERE DANGEROUS OR POISONOUS DUSTS ARE PRESENT

Let us now consider what present steps will constitute "special care" where dangerous or poisonous dusts are present: in other words, what shop precautions are now known to be absolutely necessary, based on the knowledge of silicosis just made available to us.

Employers in industries where free silica is present in the atmosphere should constantly be alert and watchful, discounting to the fullest extent every possibility of danger. Employers should not conclude that they have entirely eliminated danger of silicosis, or of any type of pneumonoconiosis, simply because the air is seemingly free from dust. It should be borne in mind that the particles which do the most harm are invisible and that they remain long in suspension in the air. It has been estimated that dust particles one micron in diameter require eight hours to fall six feet in still air, and that even larger particles, 5 microns in diameter, require nearly an hour to fall to the floor from the height of a man. Particles remaining so long in suspension in room atmosphere continue the danger throughout the entire working day, hence the urgency of postponing sweeping and dusting until work for the day has ceased. Often dust is thrown back into the air during these operations. Furthermore, dust of dangerous character may be so extremely fine in grain as never to settle at all but remain in suspension indefinitely.

Assuming, then, that employers in hazardous trades are not only willing but very anxious to protect their workmen, we come to consider the steps by which they can approach the attainment of this end. These steps, undoubtedly, involve not only the expenditure of sufficient money to procure the best possible modern protective equipment (ventilators, exhaust systems, dust collectors, respirators, and the like), but also a readiness to face the expense of subjecting their workmen to thorough physical examination when employment starts, and to reexamination at intervals not exceeding six months during the entire course of employment.

Employers should see that workmen are not exposed to the danger of tubercular infection from one another, that every facility in the way of dressing rooms, lunch rooms, and wash rooms is provided, and that every piece of protective equipment is kept in perfect working order.

Good housekeeping is, after all, one of the major considerations in the protection of workmen where there is dust of a hazardous nature. Dust-exhausting systems are of no use unless they are so applied to the work as to really carry off a large part of the dust and deposit it in receptacles where it cannot again work harm. Preferably the suction should draw the dust downward, away from the face of the operator. Many dust-collecting systems suffer from lack of maintenance, or from not being correctly applied to the operation. In one plant visited last year the author noticed that the flue pipe between the inlet and the exhaust fan had opened at a joint so that air drawn in at the working entrance—if any was drawn in—tended to be thrown

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out again into the room at an elevated point, thus greatly augmenting the original hazard.

Then, too, sandblast cabinets should be kept in perfect working order so that they do not send out into the atmosphere jets of dust from bad joints, leaky doors, or tattered curtains. Frequently the hoods over open sandblasting cabinets are badly designed for protection against fine dust. Helmets used by sandblast operators must be of modern design, supplying to the workman ample pure air, otherwise they are worse than useless.

Workmen having to do with bag filling, loading and unloading of pulverized sand, asbestos, talc, clay, feldspar, and other silicates, as well as those handling lead in bulk, should receive special care, as should also workmen making up batches in glass plants.

DUST-EXHAUSTING SYSTEMS—RESPIRATORS

Naturally, the first type of mechanical protection to come to our minds is that provided by systems of dust exhaustion. These are very effective when the inlets are applied close to the source of dust production, but their utility is less evident when they are considered in connection with suspended dust in large workrooms; in such open spaces ample ceiling ventilation and air cleaners are more helpful. There seems to be difficulty in the way of the removal of fine-dust deposits in room spaces by any mechanical or electrical means other than the direct application of good vacuum cleaning apparatus.

Protection of workmen by means of respirators is also indicated wherever the room air cannot be kept moderately free from dust, and, of course, doubly indicated in operations that are unusually dusty. In all kinds of sandblasting, workmen should be individually protected, without fail. When possible, the form of respirator which provides for the workman an ample supply of pure, fresh air under direct pressure is certainly the best, provided every precaution is taken to see that the air is free from oily vapor and dust. There are, however, some occupations in and around plants where direct-pressure respirators cannot be employed without greatly impeding the necessary activity of workmen, and in such places much care should be taken in the selection of dry-filter respirators to see that these are not only efficient and easy to maintain in good working condition, but also are as comfortable as possible. The use of wet-sponge respirators is a doubtful practice, owing to possible variations in the quality and size of sponge, degree of wetness, cleanliness, and other factors.

RELUCTANCE OF WORKMEN TO EMPLOY SAFEGUARDS

More often than not employers urge that their workmen are not willing to wear respirators, or that they wear them only occasionally. It must be evident to any one that if this neglect of personal protection is actually practiced, the situation from a protective standpoint could not possibly be much worse. Part-time protection can hardly be considered as protection at all—rather it is only a form of self-deception. If workmen will not wear respirators because of alleged discomfort, an effort must be made to provide them with devices that really can be worn during full-time employment; but full cooperation will probably not be attained without acquainting the worker with the danger to which he will be exposed if totally or partially unprotected.

ELIMINATING DUST IN ROCK DRILLING

(The drill operates through a dust collector consisting of a metal cap connected by a hose line to a suction tank and dust catcher.)

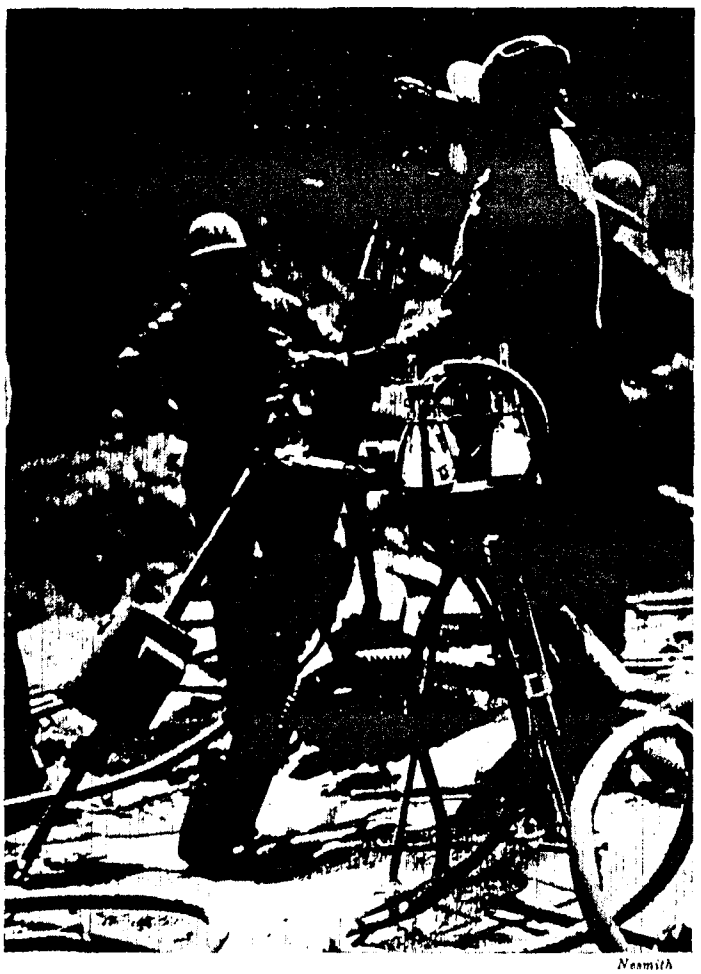
Getting workmen to wear safety devices requires the same mental attitude on the part of the management that a good salesman must have when he goes out to capture a difficult new account. If the management is not convinced that protective devices must be employed at all times, and if they, in turn, cannot convince their shop superintendents and foremen that such devices are necessary, then they cannot but blame themselves if workmen fail to manifest a good spirit toward self-protection. For psychological as well as for protective reasons, shop superintendents, as well as foremen, when approaching dusty operations should invariably wear their respirators, and even visitors to plants should not be permitted to enter dusty departments without wearing

respirators. In this way workmen can finally be convinced that the management truly believes in full-time protection. For best results every one concerned should be willing to live up to the rules of the shop, without exception. In this work any weakening on the part of the management is fatal.

The most erroneous and expensive policy any employer can adopt is to minimize to his workmen the dangers of free silica dust; no true observance of dust protection can be expected from the workman unless he is fully acquainted with the dangers of his occupation.

It cannot be assumed that workmen in our American factories are so unintelligent as to wish to ignore dangers about which they have been fully informed. Rather they, like the rest of us, are apt to scoff at occasional warnings, preferring to doubt that danger exists. It is essential, then, that the management should know the truth first of all. Supervisors should be told the whole story, and workmen severally and individually, in season and out of season, week in and week out, should be educated, warned, and even cajoled into full observance of the rules. Anything short of this will never bring about a decrease in silicosis where free silica is handled. Unless this end is attained the burden of liability expense, whether determined by civil suit or by workmen's compensation laws, will grow progressively heavier as statistics accumulate.

Where this has not already been done it would be wise, as an additional precaution, to organize shop committees in dusty plants. These committees, selected from management, supervision, and common labor, should make periodic inspections of their respective plants and draw up recommendations for improvement in equipment and shop maintenance. Recommendations made by shop committees so constituted are generally more convincing to workmen than orders issued directly from headquarters, and considering the situation as to liability, no step, however radical, is to be overlooked or neglected. Liability cannot be lessened by having workmen sign waivers, or by any other means than protection and prevention.



ROCK DRILL MOUNTED ON TRIPOD AND EQUIPPED WITH DEVICE FOR THE ELIMINATION OF SILICA DUST

(The bottles shown on the tripod measure the amount of silica which will be inhaled by the drill operator.)

PROBLEM OF LEGISLATION IN OCCUPATIONAL DISEASES

At the present time there is a need for the inclusion of pneumonoconiosis (a general term covering fibrotic lung conditions due to mineral dust) in the workmen's compensation laws of all states in which it does not now appear or is not clearly covered by implication. It is certain that a number of evils in legal practice which now exist would be eliminated by taking damage suits for such occupational diseases out of the civil courts. At best, however, the problem of legislation in occupational diseases is a difficult one, as many states now considering the subject fully realize. There always remains the difficulty of determining the degree of injury and the exact final outcome. Thus opinions cannot be fairly framed except after the most careful and intelligent study of clinical symptoms and X-ray records.

The truth, then, is forced upon us that, after all, the best way to meet the situation as it is unfolding is to start now to take every possible step in the direction of prevention. As long as new cases of silicosis continue to appear, employers will have to foot the bill, often rather unfairly through civil-court trial, or probably in a fairer way under the workmen's compensation laws; but in any case the obligation remains. Insurance companies, if they carry silicosis risks for employers, will demand a rate which will meet their losses, so in the long run there is but one answer, and that one is the complete education of the employer and his workmen—combined with unremitting efforts toward prevention.

When management and workmen pool their interests in behalf of safety, then certainly safety will finally be won. Research lies with the scientist, but the intelligent application of the knowledge thus obtained, as it applies to occupational diseases, is a moral responsibility of industry.