

FILE NAME: Edison Electric Institute (EEI)

DATE: 1939 Jan

DOC#: EEI002

DOCUMENT DESCRIPTION: EEI Bulletin - Occupational
Disease Hazard in the Public Utility Industry

EDISON

ELECTRIC INSTITUTE

BULLETIN

Two Sections

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JANUARY, 1939

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EEI 00019

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EEI-5

Occupational Disease Hazard in the Public Utility Industry

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A paper presented before Public Utilities Section at the 25th Safety Congress,
National Safety Council, Chicago, Oct. 10-14



DR. WITTMER

THE Public Utility Industry as compared to other types of manufacturing, processing, or mining operations, enjoys an enviable position in being relatively free from occupational disease hazards.

True, definite accident hazards peculiar to the manufacture and distribution of the commodities of the utility companies have always been present and are very obvious, i.e., electric shock, electric burns, gas poisoning, and steam burns; and, because the accident hazard has been so obvious, every advancement in the industry has been paced with provisions to reduce these hazards to a minimum. With the innumerable contacts and ever present exposure, the present low incidence of electric shock, electric burns, gas poisoning, and steam burns in the industry is a great compliment to modern engineering achievements in safe practices and operation. While these conditions, of course, will not be treated in this paper, I will take this opportunity to stress the importance of intensive and unceasing effort in devising a better treatment of electric shock and particularly the low voltage shock.

On casual observation it would appear that the possibility of occupational diseases can be ignored in the manufacturing, distribution, and sale of electricity, gas, and steam. While the high hazard of disease definitely peculiar to employment and common in some industries is not present, investigation and experience has shown that the "possibility" is present. The fact that the occupational disease hazard is not obvious makes it all the more insidious and demands more alert and persistent efforts on our part in order to protect the employee.

The purpose of this discussion is not to enter into a controversial question as to what is an occupational disease. In those States where scheduled occupational diseases are specified in the Workmen's Compensation Act, comparatively little controversy arises. It is in those

States where the so-called "blanket" or "all inclusive" Act has been passed that we must look for interpretation.

An occupational disease has been defined as:

"A disease peculiar to the occupation in which the employee is or was engaged and due to 'causes' in excess of ordinary hazards of employment as such."

In 1935 the New York State Industrial Board, before the "all inclusive" amendment became effective, offered the following definition for the guidance of its referees:

"The disease must be characteristic and peculiar to the occupation to make it come within the provision of the law."

A recent court decision in the Connecticut Supreme Court of Errors ruled that:

"To come within the definition, an occupational disease must be a disease which is a natural incident to a particular occupation, and must attach to the occupation a hazard which distinguishes it from the usual run of occupations, and is in excess of that, attending employment in general."

It is with this interpretation that we will consider the occupational disease

hazard in the Public Utility Industry.

Consistent with uniform experience, dermatitis is one of our major problems. A dermatitis can vary from a mild irritation lasting a few hours or days to a chronic weeping lesion which may continue for weeks or months. Dermatitis may and can be produced by the preservatives and insulating substances incorporated in various kinds of equipment. In order to avoid dermatitis, particular care is necessary not only in the selection of insulating materials, preservatives, and even transformer oils, but also in the way it is to be handled by the men.

One would little suspect that rhus toxicodendron was a problem with a metropolitan utility company, yet each Summer we have had several compensation cases arising in our distribution work where contact with poison ivy was a natural incident in the employees' particular occupation. Certainly education in the recognition of the poison ivy plant and immunization of the more susceptible helps to eliminate this hazard.

Care must be used in the selection of all materials used for cleaning purposes. Even the ordinary hand soaps made available for the personal use of employees must be carefully selected. In considering any problem of industrial dermatitis we are all aware of the frequency of individual sensitivity where the material itself may not be considered at fault. A substance may be entirely harmless to the vast majority of the men but peculiarly harmful to a certain few. Therefore, our problem is not only in the selection of materials and education in the proper handling of these materials but also, in not permitting the employee who is allergic to certain substances to work where he will be exposed to them. The only solution for elimination of dermatitis in a man who is individually sensitive is to permanently remove him from exposure.

One of the most troublesome problems of the industry is the hazard incident to

volatile solvents. Outstanding in this group is carbon tetrachloride. Carbon tetrachloride is extremely and dangerously toxic. When inhaled in concentrated form in space that is poorly ventilated, it will produce unconsciousness with practically no premonitory symptoms, followed by almost immediate death. Several years ago we made a study of the use of carbon tetrachloride and found a surprisingly large amount used in various maintenance operations. As a non-inflammable grease solvent, it was a favorite in maintaining good housekeeping in a generating station. It was extensively used in cleaning meter parts and in the inspection and repairs of meters. While no claim had been filed, and to our knowledge there had been no cases of poisoning, we discourage its use entirely wherever the operation permits. Carbon tetrachloride is not as vitally necessary, as one would think, for cleaning purposes in most of the places where it is used. Stations where it was considered indispensable have since its exclusion maintained a clean house and efficient operation by using only clean rags to keep the equipment free from dirt, grease, and grime. Where carbon tetrachloride is essential to the operation of the plant, we insist on a closed system, adequate down draft ventilation or a fresh air mask for the workman, whichever is the more practical. A close check is kept through our Purchasing Department of the amount of carbon tetrachloride used and through inspectors of the safety group, as to where and how it is used. Another important use of carbon tetrachloride in the industry is in the fire extinguisher. Happily, fires do not occur often and the incident exposure is rarely in a small confined space. The use of a substitute such as trichlorethylene has been discouraged. We are of the opinion that from a practical operation standpoint it presents a greater health hazard than carbon tetrachloride. When it is used the same precaution mentioned above should be followed. The extreme fire hazard incidental to the use of benzene, gasoline, or alcohol discourages their use, and accordingly, they present practically no health hazard.

Wherever lead is used in any combination whatsoever, the possibility of lead poisoning is present. However, the use of lead in the utility industry is so apparent that the hazard is easily controlled and can be quickly eliminated. The lead covering the transmission cable and the soldering of splices offers no

problem of lead poisoning, if the workman follows ordinary rules of personal hygiene so that he does not ingest the lead. The soldering operations incidental to meter repair work offers no difficulty if hooded ventilation and strict personal hygiene is followed. Lead melting operations in the reclaiming of scrap conduit or for surfacing parts is not hazardous, if the temperature of the lead pot is held to that point where there is no emanation of extensive fumes but, even then adequate exhaust ventilation is advisable since one cannot always visualize chemical vapors. Acetylene cutting of lead pipes does present a problem of lead poisoning, if the workman is not given adequate protection from lead fumes. The maintenance of equipment and properties require the services of painters who still must use paints containing lead. The degree of hazard and the possibility of controlling the hazard is the same as with painters in any other industry, viz., to eat food unsavored with paint particles from the hands and to keep the hands out of the mouth. Probably the greatest possibility of the workman ingesting or inhaling lead dust in the utility industry exists in the operation of chipping or blowing off lead paint from old structures preparatory to repainting. Here, respirators and good hygiene are absolutely necessary.

It is well here to call attention to the utmost care which must be taken in concluding that an occupational disease really exists. It must not only be clearly demonstrated that the individual's complaints or incapacity is due to a toxic material, but very definitely that the particular occupation exposes the employee to that toxic material. Three recent cases illustrate this problem. First, a middle-aged employee who had been a painter for fifteen years was confined to his home suffering with headache, nausea, vomiting, and elevated temperature. The attending physician informed on his first visit that the man was a painter, filed a report with the State Labor Department that the employee was suffering with lead poisoning. Extensive studies of blood and urine during the next month failed to show any evidence of pathological lead absorption. The employee actually presented a classical picture of acute intestinal infection. He received treatment for this condition and was sent back to work in two weeks. Subsequent investigation has shown the man to be in good health since. Conversely, another employee in his thirties who had worked as a painter

less than two years was treated, over a period of three months by several doctors, for gastroenteritis and cystitis: a close checkup, cystoscopic examination revealed his urinary tract complaints were due to the heavy metal poison. This diagnosis was confirmed by testing the blood and urine.

Again, a case of lead encephalopathy occurred in a fifty year old Italian borer, who had always done pick shovel work. While the mental symptoms might have been thought of as indicative of lead poisoning, extensive investigation revealed the fact that he no time had ever worked with lead. The nearest clue to the source of the poisoning was the fact that the employee had always made his own wine.

The reconditioning of equipment, furniture, and vehicles presents the problem of spray painting with all the attendant risk of poisoning from volatile solvents contained in the paint removers, paint enamels, and lacquers. I cannot emphasize too strongly that the employee must be protected by forced draft ventilation of a spray paint booth or by wearing suitable fresh air mask.

Welding is a necessary procedure in construction and maintenance work. While it is generally conceded that the health hazard associated with welding operations is not great, yet precautions must be taken. We all are aware of the necessity of protecting the eyes from the rays of electric arc welding. The different metals to be welded, the impurities in these metals and the materials contained in the coating used on welding rods make it necessary to protect the men from the metal fumes emanating therefrom. We insist on the following procedures in our welding operations. On the small job in a well ventilated area there is no metal fume hazard. On the big job requiring several days or more of exposure, fresh masks must be worn; if forced exhaust ventilation cannot be maintained, the welding shop where small welding operations are going on continuously, adequate exhaust ventilation must always be maintained. Under all circumstances, the eyes of the welder and "rounding" workmen must be protected.

Silicosis is not a problem in the utility operation in the industry. While there is any tunneling job which requires drilling through silica-bearing rock there is, of course, a silicosis hazard present. In the average street excavation work, the laying of mains, or the re-

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of underground transmission lines, I believe that it can safely be conceded that such drilling operations incidental to this work present no silicosis hazard. The workman's head is usually well above the street level and being in the open, he is not exposed to such a dust concentration as to cause silicosis. It is conceivable that even in some street excavation jobs that the character of the excavation can be such, that unless dust protection equipment is applied, that the man may be exposed to a dangerous concentration of silica-bearing dust. All jobs must be studied and answered according to the conditions presented. We are often, of course, confronted with the problem of the rock driller being incapacitated from silicosis contracted in the course of previous employment. In my opinion, this troublesome problem has been at least partially solved by the provision in New York State whereby the workman is not deprived of employment even though by x-ray and history he shows evidence of silicosis, but on the other hand the employer is protected by a fixed period of liability, should the workman become incapacitated. Our information and knowledge as to relationship between pulmonary tuberculosis and dust exposure is in such a state of confusion that I merely mention pulmonary tuberculosis as an associated problem which still has to be satisfactorily solved wherever there is a possibility of excessive dust exposure. The solution of this confused state rests more with the medical than the engineering fraternity.

The inventive mind of the engineer and chemist in developing new processes, new materials and new uses of old materials, places mechanical progress in advance of our knowledge of the health hazards which may be present in the new procedure. As an example, I cite the process of metallizing wood and other surfaces. This new metallizing process under experimentation in one of our construction shops resulted in a case of cadmium poisoning in one of our employees. Fortunately, it was a mild exposure and the employee was not seriously ill nor did he have any after-effects result. It illustrates the care which must be taken in making sure that no health hazard exists in any new procedure.

Recent attempts in the literature to confuse the results of acute carbon monoxide poisoning with claimed effects from so-called chronic carbon monoxide poisoning warrants some comment. There can be no question but that in some cases harmful after-effects may result from

acute carbon monoxide poisoning. It is also generally conceded that the possibility of after-effects is greater where the individual has been exposed to a low concentration of gas over a long period of time, that is continuous exposure for several hours or even a day or two. We also know that in this type of exposure the probability of fatality is greater. But these are still cases of acute carbon monoxide poisoning and any unfavorable sequellae which may be attributed to the exposure are the result of "acute" carbon monoxide poisoning. I have never seen, nor do I know of any authentic case where symptoms or pathology were the result of repeated exposure to a low concentration of the gas for short periods; or where at the time of the exposure the individual had no symptoms. So, while we do recognize the occupational disease consisting of the sequellae following acute carbon monoxide poisoning, yet we do not recognize any problem of so-called "chronic carbon monoxide poisoning."

Contrary to popular belief, the incidence of acute carbon monoxide poisoning in the utility industries is comparatively rare. The requirement of efficiency in production and distribution demand a closed system and a minimum amount of waste due to leaks. I believe it can safely be said that the workman in a gas manufacturing plant or around a holding station is exposed to less carbon monoxide than the average traffic officer at a busy metropolitan intersection.

It must not be inferred that just because the material is toxic, or capable of producing an occupational disease, that the material or process must be discarded. If this viewpoint had prevailed you would not be enjoying the benefits of electricity, gas, or steam as we do today. Only recently two methods of processing the ends of poles to prevent decay and termite destruction were presented to our Medical Department for an opinion as to the health hazard. In each process the chemicals used were poisons. However, in conferring with the engineers, a procedure in the using of these two processes was devised, i.e., using heavy gloves or long handled brushes; or where the chemical was injected into the pole, unbreakable containers are used, so that there is no health hazard at all present to the workmen who follow instructions. Without discarding the material the hazard was nicely removed.

In conclusion, study and analysis of the activities in the public utility indus-

try reveal that some degree of occupational disease hazard does exist. The fact that very often the hazard is not pronounced increases the problem of prevention. According to the necessity and the conditions, various approaches to avoid the hazard must be utilized. The knowledge and control of the amount of dangerous materials used is helpful. Because there is no alternative, many operations using materials which present a health hazard must be continued. The proper answer essentially is to provide safeguards so that the operation is free from all hazards. Any new materials or the institution of a new function should be carefully studied by both the medical and the engineering sections. They, together, should be certain that no health hazard is present before the material or operation is put to use.

The public utility industry must constantly keep before them the possibility than an occupational disease hazard may exist in any of their various operations. It is only by a continuing preventive program that the employee will be adequately protected. Need I say that the employer will also thereby be aided in getting a better job done?

There is no need for any hysteria over the occupational disease laws which are being enacted. A calm, intelligent, and rational approach to the problems which they present will eventually result in an improvement in the health of our workmen and a benefit to the industry.

One of the greatest hazards in this industry or in any industry is the human reaction to existing hazards. Contempt because of familiarity or long contact with a procedure or substance is hard to overcome. However, constant reiteration of rules and regulations and in special instances severe disciplinary action do aid in holding down the number of cases. Absent-mindedness or periodic lack of concentration does increase the exposure hazard. Close observation and an understanding of the character and behavior of each employee by the immediate supervisor is of material aid.

A rule or regulation is enforceable and is highly successful only when it is clearly understood and has the whole-hearted cooperation of the employee.

Occupational disease should be held to a minimum because:

1. The employee is entitled to and the employer is morally obligated to see that work is performed under the most healthful conditions that men and science can devise.
2. A healthy worker is happy, is efficient, and is regular in the performance of his duties.