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A Medical and Industrial Hygiene Control Program
In Widely Scattered Plants

L. E. HAMLIN, M. D.,
Medical Director,

and

H. J. WEBER,
Medical Department,
American Brake Shoe Company,
Chicago, Illinois

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nurse in 1942 and now employs 25. In a few locations a single nurse takes care of two plants while in one area a very satisfactory arrangement allows a nurse to service two plants in other industries in close proximity.

The type of program matters little as long as it is effective and demonstrates the points of attack. Adequate records are essential but there is danger of going overboard on details in our enthusiasm to do a complete job. At one of our locations recently a personnel manager devised a very detailed form for prospective employees which contained a great many questions concerning background, previous experience and personal attributes. One question asked was "What hobbies do you have?" An applicant for work answered—"Chawin' tobacco." Perhaps he was serious and possibly the question was in order but the reply illustrates the point that if cooperation is desired in obtaining authentic information some thought must be given to the matter of intelligent questions. Not long ago a pilot told me of a similar form which all employees of his airline were required to complete. Many of the questions were so absurd that the routine reply to most of them consisted of a single word—"Whatevs!" So let us keep the records straight. We have revised ours at least four times in the past six years in favor of simplicity without sacrificing necessary details.

Management Support

ONE of the first essentials in the success of any health hygiene program is cooperation and support from top management. Plant supervisors must be made to understand that the recommendations of the Medical Department have to be given serious consideration. Most progressive superintendents "catch on" quickly but always there are some who refuse to see the light. They resent fancied interference or what they feel is being told how to run their plants. The approach should be one of "selling" industrial hygiene and medical care rather than anythingavoring of a dictatorial effort. Otherwise one need not

expect permanent results. A superintendent who carries out industrial hygiene recommendations because he has to cannot be expected to cooperate and he can find numerous apparently valid excuses for procrastination. Occasionally such an attitude can only be changed by pressure from top management but a threat to shut down a plant until corrective measures have been carried out, while it may be effective, is not productive of future industrial hygiene happiness.

Perhaps the biggest single factor in successful operation of an industrial hygiene plan is the need for thoroughly convincing the plant operating head of the obvious advantages of good hygiene and demonstrating how these can effectively result in better production, satisfied workers, less absenteeism, fewer occupational disease claims and lowered production costs. The superintendent is a key man who can make or break your program. Once he is convinced, the major part of your difficulties are over.

Sometimes the man from whom you least expect cooperation turns out to be your most ardent disciple. A pat on the back in the way of bringing his good showing to the attention of top management not only pleases his ego—a very human reaction—but makes him more determined than ever to surpass his already excellent record. Such an individual permits no shirking in his shop, tolerates no short-cutting or lapsing of established hygienic practices and insures appreciable results, which incidentally reflect credit on the Medical and Hygiene Department.

Many Aspects to Industrial Physician's Part in Program

THE part played by the doctor in industrial health and hygiene is an important one. Aside from his responsibility in directing the program he should never be unmindful of the necessity for cooperation with management and plant personnel. He must be familiar with the various plant operations and should display an intelligent interest in local procedures and

phoceeds. Imagine its surprise when the only response was a grievance to the effect that instead of putting all that money into a building it should have been handed out to the men themselves.

Another plant, in order to improve conditions, installed a new Bradley fountain in its shower room. Shortly thereafter the superintendent informed me that it was a mistake and that they could not use it any more. On further inquiry it turned out that the employees insisted on using an ordinary bucket of water which they placed in the fountain and instead of soap they preferred to use small cores from the fountain with which to scrub their skins. Naturally, the accumulation of sand in the fountain soon stopped up the drain and put an end to its usefulness. One might say that this was management's fault but remember this was in the war years when the labor turnover was at its worst and strikes were often called for very trivial reasons.

Perhaps the psychological approach to new ideas is wrong. Workmen resent paternalistic attitudes and a "mother knows best" pose. Providing the new shower and locker room without taking into consideration the fact that perhaps the men would like to be consulted on what they might want in the way of such accommodations, probably produced the unfavorable reaction.

The same objection should be considered when making recommendations for improving hygiene or exhausting machines. Too often plant managers, engineers, ves and industrial hygienists get their heads together and say "Now this is what has to be done on Joe Smith's job." Great care and thought are employed in designing the exhaust equipment and frequent conferences are held right on the job while the machine is in operation. Joe listens but no one asks him any questions or what he might think of the idea. He is paid to turn out his quota of parts and is not supposed to know what is best for him. Of course Joe has only operated this particular machine for a matter of twenty-five years or so and if anyone should know its

peculiarities he should. Joe says nothing but he has his own ideas which not uncommonly are more practical than those of the expert. So what happens? Joe's machine is fitted with some new device. He is told to use it, but he does not like it. All these years he has done the job his way and it worked. Now they are going to embarrass him with some new fangled contraption which he has resented from the start. He deliberately tries to circumvent the whole thing and usually manages to do a good job of it unless he is under pretty rigid supervision.

Now suppose the experts had come to Joe and said "Our hygiene survey shows that there is too much dust on this job and we want to clean it up for you. Here's what we have in mind, what do you think of it or how do you think it will work? Have you any ideas about it yourself, you have been operating this equipment all these years?" Joe's attitude is entirely different. He feels that he is of some importance and that consideration is being given to his years of experience of which he is naturally jealous. Instead of being a rank outsider he is now part of the team. He probably comes up with a notion that has real merit and possibly on a point the experts have overlooked. He sees it included and, from here on in, Joe is the most cooperative employee in the shop. He does his utmost to make it work because an idea of his is in it and he wants to demonstrate its worth. Moreover he is constantly on the lookout for more and more ways of improving things and management has made another convert to industrial health and hygiene. Perhaps the illustration is a bit overdrawn—I do not think so. It will not always apply but in general the psychologist is so obviously right. Let us not forget to do a bit more of taking the man on the job into our confidence.

Periodic Industrial Hygiene Surveys

HEALTH hygiene programs in widely scattered small plants are sometimes difficult to institute. A well-planned pro-

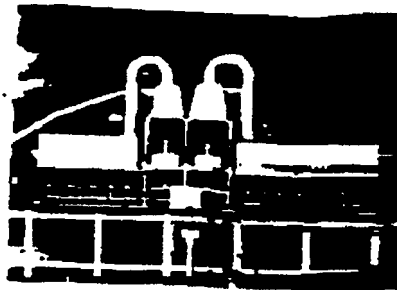


Fig. 3.

Cloth filter dust armature with evidence provided for asbestos dust at brake lining plant.

took no cognizance of the fact that every individual machine has its own exhaust unit; disregarded the fact that the plant is a model of excellent housekeeping. He consulted his handbook under B for brake lining, found asbestos listed and made an unwarranted classification of hazard with a consequent increase in premium. The union approached management with their grievance. A photostatic copy of the report of the routine survey, showing dust counts of the order of one million particles per cubic foot and less, was sent to the insurance company and the rates were

promptly revised. This had a three-fold effect. It showed the union we were there to help, it sold the industrial hygiene program to the management of the plant, and it impressed us with the importance of having quantitative records of hygienic conditions as derived from the routine survey.

We also encounter humorous things in our surveys. We have a plant in the north that makes only brake shoes—a grey iron casting. Our surveys indicated no hazard. However, during the war, we had a colored woman working in the core room. Whatever her motive, innocence, spite, or patriotism, she wrote to the President of the United States and informed him that the American Brake Shoe Company was making poison gases. Imagine the superintendent's surprise when he was shortly after confronted by a Colonel from the Chemical Warfare Service. Actually we did have some acrolein fume as a result of the decomposition of core oil but it was below the allowable limit; and oddly enough, acrolein is a war gas! However, we do not make it; it just occurs and we are glad to get rid of it as soon as possible.

It cannot be stressed too much that

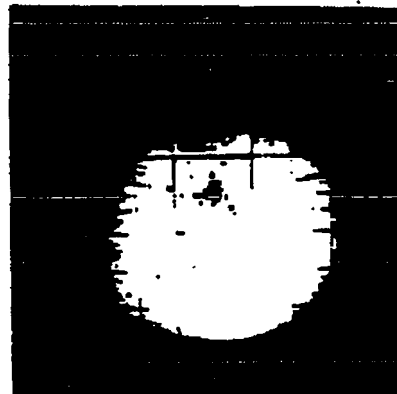
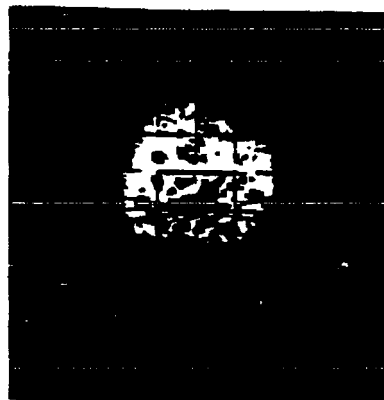


Fig. 4.

(a) Dust collected near shakedown. Note large wet particles.

(b) Dust from grinding operations in cleaning room. Note large number of very fine particles.

must consider the central tendency of many samples in order to use the spot sample as a reference norm of exposure. This means mass urinalyses (1000-5000 a year), and to do this with one analyst, one must resort to rapid methods such as polarographic determinations. In this way, urinary excretion rates will correlate with lead-in-air concentrations and the spot sample then becomes an effective control and ideally adapted to decentralized industry. (Table I.) Urinalyses are supplemented by blood analyses when indicated.

Table I
CORRELATION OF URINARY LEAD EXCRETION
RATES WITH LEAD IN AIR

Lead in Air Micrograms per Cu. Ft.	Urinary Lead Micrograms per Liter
14.5	140
17.5	240
12.5	210
12.7	420
12.9	210
14.1	270
1.2	140
1.4	140
1.7	140
1.2	200
1.4	70

*Average of 3 samples at each station.
-Average of all employees exposed.

Here are a few examples of the usefulness of spot samples used as explained:

In the machine shop of one of our plants, the air was as clear as one would expect in an office. No hazard was known to exist there. During routine urinalyses, it was noticed that a certain lathe operator was excreting hazardous amounts of lead. An air sample was then collected at this work station and it was also high in lead. Investigation revealed that a new type of centrifugally cast bushing was being machined and the lathe was making the initial rough cut which gave off fine particles of brass dust. The lathe was hooded and both lead in air and urinary lead fell in safe values.

Again in another plant, one of our men was working in a reclaim room. The metal reclamation is a wet process and our air samples showed it to be safe. During routine urinalysis, we noticed that this em-

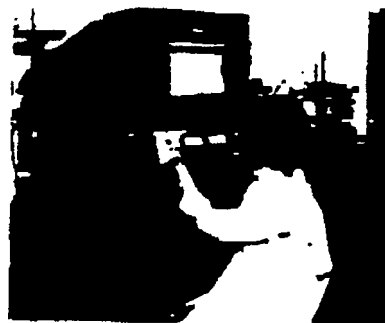


Fig. 2
Determination of lead in urine using a polarographic method.

ployee's lead excretion rate was dangerously high. Investigation of the case revealed that he had begun a practice of drying out his reclaim trough with wheelabrator dust. The scattering of this material created a hazardous exposure.

These and many other hazards were discovered by the spot sample soon enough to prevent deleterious effects.

Approval of Ventilation, New Processes and Materials

Our industrial hygiene program has also the following features:

1. All ventilation design, plant construction, change in process, must be approved by the medical department before execution.

2. New materials must be submitted for an opinion on toxicity before they are used on a large scale.

This latter rule had its origin in an odd way. In one of our plants where machining is the principal operation, we suddenly had an unusually large number of cases of dermatitis. The cutting oils were suspected. Samples of the oil before and after internal use were sent to us but we were unable to find any fault with them. Furthermore, these types of oils had been used for years before without any trouble. We then requested samples of the hand soap being used. Our analysis showed it to be sand.

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