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20th NATIONAL SAFETY CONGRESS

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NATIONAL SAFETY COUNCIL, INC.

Foreword

THE Transactions of the 28th National Safety Congress and Exposition of the National Safety Council, October 16-20, 1939, are published in two volumes. Volume I contains the general and subject sessions and the sessions of the various Industrial Sections. Volume II contains the Street and Highway Traffic, the Commercial Vehicle, the Transit, the Child Education, and the Home Safety sessions.

Volume I is distributed automatically to all industrial members of the Council. Volume II is sent to members who are believed to be interested chiefly in the sessions it contains. However, other Council members may obtain Volume II upon request.

Many members have found it of benefit to distribute copies of the Transactions volumes to both executives, foremen and supervisors, who have used the practical information they contain in safety programs and for general reference purposes. Extra copies of the Transactions may be obtained as follows: One to 10 copies of Vol. I, at $2 each; 11 or more copies, $1.75 each. Extra copies of Vol. II cost 75 cents each.

THE Transactions are a condensed record of the proceedings of the Congress. The papers and addresses have been edited to delete extraneous matter, abbreviate the less important portions, and emphasize what may be of particular usefulness in promoting effective safety organization and other accident prevention measures. These volumes, therefore, are a somewhat abridged version, compact, practical and of particular value to the student and executive interested in achieving more thorough accident prevention success. The original manuscripts are available for additional reference, if desired, in the files of the National Safety Council.

THE National Safety Council, at its Congresses, seeks to eliminate from discussion matters which are not pertinent to the aims of the Congress or which may be contrary to the Council's policies. It cannot accept responsibility, however, for all views expressed either in the papers which have been delivered or in the discussions based upon these papers.

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Occupational Disease Control

THURSDAY MORNING SESSION

October 19, 1939

The session planned for the discussion of problems in industrial occupational disease control was called to order by A. S. Johnson, Assistant to the Manager, Engineering Department, American Mutual Liability Insurance Company, Boston, Mass., who presided. The problems were presented as a panel discussion, and Chairman Johnson introduced the members of the panel, as follows:

Roy S. Bonsib, Chief Safety Inspector, Standard Oil Company of New Jersey, New York City.

Warren A. Cook, Division of Industrial Hygiene and Engineering Research, Zurich General Accident & Liability Insurance Company, Chicago.

Dr. A. G. Cranch, Industrial Toxicology Department, Union Carbide Company, New York City.

Dr. Leonard Greenburg, Executive Director, Division of Industrial Hygiene, New York State Department of Labor, New York City.

Willis G. Hazard, Personnel Division, Owens-Illinois Glass Company, Toledo, O.

Dr. E. G. Meiter, Director, Industrial Hygiene Laboratory, Employers Mutual Liability Insurance Company, Wausau, Wis.

Dr. O. A. Sander, Milwaukee, Wis

The Discussion Plan

CHAIRMAN JOHNSON: We have agreed to have a working base from which we will talk. This working base from which we will try to develop our opinions is what I choose to call a triangle of responsibilty, visualizing what may be called the three A. B. C.'s of an equilateral triangle.

At the top of this triangle is management of an industrial enterprise, the man who has to pay the bills, the man who hires the labor, the man who worries about their health. On the left base is the medical side. They are the group employed to carry out the medical part of industrial management's responsibility. And on the lower right is the third base of this triangle where we find the engineers or industrial hygienists, who have to develop and prepare for the operating group the controls of occupational disease, as far as engineering is concerned with controlling them.

Now, there is a strong tie between the medical and the engineering phases through that base line of the triangle. What we hope to do in discussing each topic is to develop that tie, which we will call the balance of opinion between the medical phases developed by the doctors on my left, and the engineering phases developed by the engineers on my right.

I would like to ask this panel a question. For a great many years occupational hazards have been studied in one industry or another. Would this panel feel, let us say, sanguine that any industrial enterprise is now ready, by employing proper personnel, by searching out the answers wherever they may be found, to solve an occupational disease problem if they have one, and by the proper solution maintain the safety and health of the employees? Put another way, are we still groping in the dark as to some of these hazards by reason of conflict of opinion, conflict of experience of data and theoretical expressions of policy who find the theoretical hazard no exposure because it is suggested in the books? Will Dr. A. G. Cranch talk briefly along this line of suggestion?

DR. CRANCH: This question is a broad one. Is any industry satisfied that it is in a position to solve an occupational disease on the basis of present information? I would say, absolutely yes, for the majority of occupational disease problems are sufficiently understood to adopt efficient measures for control.

CHAIRMAN JOHNSON: Frequently I hear it said, "Well, why should I do anything about this until you folks come to terms on whether I ought to have ten parts per million or two thousand parts per million?" Let us develop this ... and ask the opinion of Dr. ... on the engineering side.

DR. MEITER: I agree with ... Cranch that there is enough ... solve these occupational disease ... If some employers are not willing ... anything at all until all possible ... tion is available, I would say that ... are never going to start.

In solving these occupational disease problems, we have a progressive solution. In the same way that the 1940 automobile could not have been built in 1929, just so are we progressing in all the branches of engineering, ventilation, ventilation equipment, and respiratory protective devices and so I think adequate information is available.

A Basis for Truth

CHAIRMAN JOHNSON: I think ... have a balance of opinion there. ... have an occupational disease hazard ... is enough knowledge stored ... the books and brains ... it in progressive fashion ... tered up, I think ... notions. I have read ... ature in which some ... opinion that because ... terials are used, ... that is just about ready ... population of the ...

Do we know enough ... and control of ... phosphorus, rad... to sort out the ... not an effective ... Dr. Leonard ... a couple of ...

DR. GREEN: ... that there ... which is ... occupational ...

... and beyond. The chief reason, it ... is why we still continue to ... stage an industry is because the ... and the worker do not realize ... of these hazards and do not ... the problem seriously enough to in... the necessary and proper means of ...

CHAIRMAN JOHNSON: Now I am ... to the engineering side ... some question. Let us visual... industrial enterprise that is fearful, ... some exposure is a ... to know if there ... industrial engineering ... that will make it impossible or ... proper instruments ... quantity of exposure, ... or fume.

... turn that over to Warren ...

... Today we have more ... for finding out how ... materials a man is ... than we have ever had ... was a very laborious ... to analyze ... the worker. ... more and more ... we are having ... are having de... will quickly tell ... material is ... by the worker. ... will determine ... monoxide ... Similar equip... other injuri... about the best ... and we hope ... ment of this ... country one of ... time it is ...

... materials ... deter... are more ... is are being ... safety en... himself of ...

... I am ... ical ... fear ... would ... define ... technical ...

Let us hold ... that progress ... comment, Dr. O. A. ...

DR. SANDER: ... sized the need of a ... occupational ... along with the ... initial examination ...

measurement? That is, by visual observation. Or does he feel that it is beyond all question desirable to have the survey made technically by industrial hygienists or by men trained to sample properly with proper instruments?

MR. BONSIB: I think the greatest trouble in industry today is that there has been too much guess work. In dealing with insidious problems such as the new substances and some of the old substances which have been introduced, it is pretty hard to hang your hat on everything, and the average executive today wants to know exactly what is what, and you cannot know that without concrete evidence. You have got to get definite information and data.

When once you know the facts, which can only be obtained through technical means and by experienced people, you can give them something definite on which they can base definite conclusions and on which you can base your preventive measures.

CHAIRMAN JOHNSON: Now I feel assured that we can discuss some detailed problems. We have our base. We are in agreement that there is no ordinary occupational disease hazard that cannot be coped with, that there is sufficient evidence to sort fact from fancy, that there are instruments sufficient in quantity and kind for proper engineering analysis, and that there is no need of guessing.

Let us start now an occupational disease control program. We have Plant X. The management at the top says, "Find my hazard, if any. Control it, if need be. I am setting up a medical department: I am setting up engineering occupational hygienists. I want you fellows to work out a program so that my operating department can install the necessary safeguards, whatever they may be, and assure me that there will be no emergence of disability by reason of these exposures."

The Medical Program

Let us build first the medical half of that program. Of what does it generally consist, Dr. O. A. Sander?

DR. SANDER: I am glad you emphasized the need of a medical program in an occupational disease control program, along with the engineering control. An initial examination of all workers exposed to a particular occupational hazard is as necessary as is the exact determination of a hazard by engineering methods.

The appearance or the findings in any group of workers exposed to a particular dust, or what have you, gives an accurate picture of the hazard which has existed over a period of years. That picture is one which the engineers cannot give you, because their dust counts or other determinations may be only temporary or may vary from day to day. It may have changed considerably in the past few years; the hazard may have been, for example, ten times as great two years before as it was on the day the dust counts were made. So no occupational disease control is adequate without initial examination of all employees.

CHAIRMAN JOHNSON: Dr. Sander has developed the need for the medical examination as a survey question to determine whether conditions as they have existed have produced any pathology in the men. Let us assume that, and install our program of control. Dr. Greenburg, what do you feel about the need for periodicity in the examination program?

DR. GREENBURG: That would largely depend on what particular hazards were present in the plant itself. In certain cases it would be desirable to examine workers very frequently, perhaps even as often as once a month; and in other instances it might be very satisfactory to examine them once a year, depending on just what particular substances the workers were exposed to in their daily occupation and how satisfactory the technical means of control were.

For example, in the case of benzol, it might be satisfactory to examine workers every three months. I believe in the case of tetraethyl lead, the du Pont Company examines its employees about once a month, though I am not quite sure about that. In the case of sand blasters, it might be desirable to examine them and x-ray them every six months; whereas in the case of foundrymen it might be perfectly satisfactory if the men are engaged in ordinary foundry work to examine them once a year and x-ray them once a year or once every year and a half.

It would be largely a question of judgment, depending on the particular occu-

process and the particular substances employed.

CHAIRMAN JOHNSON: I would like to ask Dr. Greenburg to amplify just one point. If the survey about which Dr. Sander spoke discloses no specific occupational disease hazard as having caused any pathology—and that is the situation that obtains in most plants—but still there may be some moderate exposures to this or to that, and the management wants to be perfectly sure, how often as a general thing should those men come up for re-examination?

Understand, this survey has disclosed no pathology, no damage, nothing you can put your teeth in or hang your hat on as indicating a great need for engineering changes in current methods of control.

Re-examination Periods

DR. GREENBURG: That would largely depend on whether there were any hazardous materials being used in the plant. If the condition of the men at the time of the initial examination was quite negative and no hazardous material is being used in the plant, I should say the decision as to whether or not you are going to have physical examinations is largely an open one, and a matter of wide judgment.

For example, in the case of a department store's employees, where young women act as salesladies, under ordinary conditions, it might not be necessary or desirable to give them physical examinations more than once in five years, perhaps not even then.

If, on the other hand, the physical examinations were quite negative, and yet toxic materials are being employed, the decision would depend on how toxic those materials are and what the analysis of the plant atmosphere shows.

It seems to me that the answer to the question is a matter of judgment which must be based on a comparison of the relative hazards of the exposure as compared with the cost and desirability of continuing intensive physical examination, and only by knowing the detailed facts can one arrive at a sound decision in a particular given instance.

CHAIRMAN JOHNSON: I think that it is very important for you all to [illegible] the opinion expressed [illegible] observe that he has [illegible] his own professional discussion, of course, with [illegible] is to pay the bill; [illegible] must rest with the doctor [illegible] presented by the [illegible] and the employees [illegible]

[illegible] book formula which [illegible] employees through the [illegible] materials. But the making [illegible] examinations is another thing. [illegible] problems, because men [illegible] frightened when they know [illegible] being examined to see if [illegible] anything the matter with them, not just being examined to see if they are all right. They are always fearful that some dire calamity may overtake them soon. It is a real personnel problem, one that has to be handled with judgment.

I am going to ask Dr. Cranch if, in his long experience of examining a great many employees for operating exposures that might not be hazardous, he has always been able to keep those employees calm and collected and quiet and quite content with what things were found.

DR. CRANCH: Physical examination programs for occupational disease control can hardly be divorced from a physical examination program aimed at general health conservation. Where it is possible to have a medical service, where the physician is in daily contact with the [illegible] physical examination presents [illegible] difficulties than where it is done [illegible] the sake of occupational disease [illegible]

If an outside physican comes in to examine certain groups of men at intervals of from one month to two years, [illegible] logically have a right to expect that there may be something going wrong. [illegible] those who are called in frequently, [illegible] that leads to considerable nervousness [illegible] their part as to what will be found.

There is a matter of psychology in practice in carrying out such a program of examinations. It is much simpler, where it is possible to arrange it, to have reasonably frequent examinations for general health conservation, and these examinations, then, will be included in the regular procedure and help to determine the effects of an occupational disease exposure.

As Dr. Greenburg said, we do not attempt as a rule a routine examination at a fixed interval of a year, we will say. The periodicity of our re-examination is determined largely by several factors: first, the possible exposure to occupational disease hazards; second, what we notice in connection with that man's health as the days go by.

Our supervisory force is usually instructed to send in any man who seems a little under the weather, who does not seem to be doing well, who seems to be slipping a little. From their recommendations often we pick up cases that certainly require examination which otherwise would easily have been overlooked.

Another thing which we have to remember is that many symptoms are common not only to occupational disease exposures incident to life in general; and the medical program for the control of occupational disease is therefore extremely important in that the contact must be established with the men to determine what changes are going on and what is their origin.

CHAIRMAN JOHNSON: The important point to me is that you cannot drag in a physician from the outside who is a total stranger to your problem, merely because he is an expert toxicologist or expert something else, and ask him to set up a medical examination or control program for about a week, and then depart.

Hire him to consult with your own physician, but let your own physician so fold the occupational disease program into the general health conservation program, that the findings of the one serve to augment and support the findings of the other.

Now I am going to talk to the engineers, and assume that a survey has been made in which we have discovered a hazard sufficiently dangerous so that in the doctor's opinion, something ought to be done about it. I am not assuming that it has gone so far as to kill men, but it has manifested itself either in moderate early symptoms or some actual demonstrable pathology in a few.

I want to ask this group of engineers what they want the medical men to tell them which they may use to utmost advantage in their own work in connection with surveying to locate and [illegible] hazard that they want to control.

Will Willis Hazard discuss that end?

MR. HAZARD: It seems to me that the most important thing that the doctor can tell the engineer is what his findings are from the physical examination. That more or less determines how serious the hazard is; it often isolates it to certain individuals in the plant, and that points the way to places that should come under engineering control in that regard.

CHAIRMAN JOHNSON: Perhaps you have already visualized what I am leading to. I want Mr. Benash to develop that a little farther. Here we have the medical examination installed to discover what is wrong, if anything. I want him to develop the engineering control aspect. What fact and what data does he need to go about his business?

Engineering Control

MR. BONSIB: Since the control damage to the human [illegible] upon the exposure and the [illegible] the engineer should know the allowable concentration to [illegible] have to maintain the [illegible] or the working conditions [illegible] gineer that is something [illegible] profession must give or [illegible] will have something to [illegible]

I think the answer to the [illegible] is that it is very essential [illegible] old or maximum allowable [illegible] permissible be known.

CHAIRMAN JOHNSON: [illegible] think we will [illegible] certain no engineering [illegible] out its neck far [illegible] medical profession [illegible] safe threshold limit. [illegible] answer to the question [illegible] however.

For a great many [illegible] medical profession [illegible] its work successfully [illegible] raining the greatest [illegible] between the employee [illegible] through the fact that [illegible] revealed what was the [illegible] man if there was anybody [illegible] grades the men in a general way [illegible] able, or employable subject to [illegible]

...ble, or employable in limited capacity.

I think I have blown upon a question here. Can the doctor inform the engineer of a sufficient number of facts about the hazard to which these men have been exposed without upsetting that professional confidence which he has established in the workmen whom he is examining?

What I want this group of engineers to develop is: Can they use adequately mass information, or information about the group, without having to know that Mike Dambrowski is about one month from emerging with a disability? Will you develop that, Mr. Hazard?

MR. HAZARD: It seems to me it is entirely possible for the engineer to use the medical results in a purely statistical manner. He does not have to know who is sick or whether it is Mike Dambrowski or somebody else. It is extremely important that he know the number of people who are showing the same ailment and the number of people who are working in the department or the plant as a whole.

MR. BONSIB: I do not see how you can protect against something unless you know what it is going to do; and I do not see how you can provide necessary protective measures without knowing to what extent you have to go on them. You must know the threshold limit to which the substance or the material, whether it is gas, fume or dust, is causing the trouble. If you do not know what the toxic limit is, that is, the amount it takes to make people sick or how much the human mechanism can stand, making due allowance for the idiosyncrasies of the susceptible, I do not see how the engineer can provide the necessary measures.

Therefore, I still maintain that the threshold limit is the essential thing for the engineer to know. That gives him something to shoot at. In other words, he must reduce that concentration to the point below which it will not make any one sick, and the length of exposure necessary to which that person must be exposed.

MR. COOK: An instance might be cited where other factors than threshold limits have been utilized. For example, in the gypsum industry, in certain plants there is what is known as a sanded plaster manufacturing operation where there is much dust. It had been thought that gypsum dust itself was the cause of or injury to the lungs. In the case of silica sand, we look for that [illegible] lungs and the development of [illegible] silicosis where the exposure is [illegible] continued over a long period of time.

Consequently, where about half of the material used in this operation was silica sand, it was the guess of the engineer that here was a condition which had to be controlled effectively in long exposure and concentration down to very low levels.

To everyone's surprise, the many examinations of workers who had been exposed to these operations for a number of years showed that there was no development of fibrosis.

Further engineering data was collected and it was found that two things happened. In the first place, the grain size of the sand was rather uniform [illegible] and well washed. There was no [illegible] action to produce a great number of fine particles. In the air itself, the concentration of free silica was not as great as what it was in the main mass, [illegible] one or two per cent. Finally, [illegible] examination showed that [illegible] quartz dust falling, or [illegible] get gypsum dust settling out [illegible] fairly rapidly, the quartz [illegible] more rapidly; and the [illegible] quartz and gypsum settled out [illegible] rapidly than either one [illegible] fact that the gypsum dust [illegible] erations with the silica dust [illegible] large groups of particles [illegible] more rapid settling.

Now, the data obtained [illegible] medical examination [illegible] what gave the first clue [illegible] completeness of the [illegible] tion was not as great as [illegible] be thought to be by the [illegible] into the situation.

CHAIRMAN JONES: [illegible] illustration lends itself [illegible] points.

I have watched that [illegible] veloped with a great deal [illegible] for a fact, the engineer [illegible] did not have to know, [illegible] men as individuals; [illegible] in his files completely.

Now let us summarize for [illegible] ment, to see where we have arrived. We

[illegible] the doctors and the engineers as the [illegible] of our triangle. Our panel feels [illegible] that hazards can be controlled. We know enough, there is enough knowledge in the aggregate to control them. We say that the need for a medical program is as vital as the need for an engineering program; that the doctor ought to be the plant doctor, augmented by such specialists as he needs to employ to counsel with him; that they have a certain amount of factual information that they must turn over to the hygienist or engineer for his use as a check for his performances, and that the medical crowd should tell the engineering crowd how low the hazard must be taken to consider it reasonably safe; that the engineers are perfectly willing and able to tackle the hazard in some fashion if they know those things; and the periodicity of the examination to find out whether the engineers did a job or not depends upon the conditions as the doctor finds the record written in the men themselves.

Of course, the engineers are going to continue to use the instruments of survey to check their own results.

Now I am going down to our printed program and explore some of the questions suggested there. The panel will discuss phases of exhaust systems. Are there in the engineering catalogues, data describing machinery of one kind or another to make it possible for the engineer to design an exhaust system if he wants it, or thinks he needs it? Are there enough high grade, glorified vacuum cleaners on the market to pick one out of the catalogue and install it in the plant, and expect it to produce results?

Dr. Meiter, will you develop your thoughts on present market conditions of [illegible] exhaust systems as against engineering design of exhaust systems to fit the individual plant circumstances?

Exhaust Systems

DR. MEITER: In my opinion, there is not available ready-made exhaust ventilation equipment. The assumption that you can select from a catalogue and ventilate your problems has been a great drawback in the progress of this work.

By that I mean this: Oftentimes a concern will have, say, a local tin worker. They call him in and he, without knowing what the [illegible] State Code, without [illegible] which the gas, dust or [illegible] exhausted, immediately [illegible] signs a hood.

Then, without even [illegible] air can be handled by [illegible] into the classified section [illegible] book and calls up the [illegible] fan company has a [illegible] in, so the office girl looks [illegible] data, and the company [illegible]

When this ventilating system is [illegible] installed, the sheet metal worker [illegible] "Well, the sheet metal work [illegible] is all right, and that is all I [illegible]

Then the fan company, on the other hand, says that the fan delivers [illegible] volume of air at the speed called [illegible] catalogue, so they must [illegible] And finally, when the whole [illegible] it does not work [illegible] done. So the point I wish to [illegible] ventilation, no matter how [illegible] technical knowledge [illegible] ments to determine [illegible] really working.

CHAIRMAN [illegible] Meiter has put his [illegible] point. When I [illegible] control, I mean [illegible] I do not mean [illegible] illustrate.

Sander talked [illegible] fever, zinc [illegible] the problem [illegible] stroyers for [illegible] galvanized [illegible] of electrical [illegible] confined [illegible] of which [illegible]

There is [illegible] might say, [illegible] fitting-out [illegible] feet long and [illegible] molded depth [illegible] many tanks in [illegible] small sizes) [illegible] most. In these [illegible] steam-fitting and [illegible] done. Can you [illegible] tilating system [illegible]

Now let us go to the next question: protective creams and lotions. Let us have clearly in mind that a cream or a lotion is smeared on the skin for a purpose, and

usually the purpose is to prevent the minimum amount of poisoning or other from coming into contact with the skin.

There creams and lotions are of two kinds, those that are water soluble for use in oily emulsions, and those which are oil soluble for use in aqueous exposures. This use of creams, I believe arbitrarily, as Chairman of this group, is not in line of any other control. These creams are used because controls cannot be made absolute, and because there are sensitive skins to be taken care of.

Dr. Cranch, would you like to discuss the effectiveness and the use of creams, from the viewpoint of the doctor who has a cock-eyed purchasing agent who buys an oil soluble when he wants a water soluble, and vice versa?

Protective Creams and Lotions

DR. CRANCH: I think you have started something. Protective creams certainly have a field in the protection of skin from various irritant substances. I would put far ahead of the use of protective creams, however, good personal hygiene and thorough cleanliness on the part of the worker. Where that is obtained, the question of protective creams is of lesser importance: sometimes negative importance.

There are certain exposures, however, where no amount of personal hygiene or cleanliness is enough to protect from possible harm. Therefore, we do have a place for protective creams of the two classes Mr. Johnson has just mentioned.

Primary in the consideration and selection of any cream, of course, is the nature of the exposure. If it is on an oily substance, we must use a water soluble cream which will form a coating over the skin and resist the penetration of the oily material.

And, on the other hand, if it is a water soluble substance from which we must have protection, we must have an oily base in the protective cream.

The first consideration, then, is that the cream itself shall not contain an irritant. That incidentally opens up the whole field of allergy. There are many people sensitive to certain of the common ingredients used in many of these protective coatings. They can probably only be discovered by means of a patch test or by actual experience in the use of the cream. In the main, some other means of protection cannot be adopted, or the man assigned to other work.

The great proportion of creams now on the market appear to be reasonably free from any irritants or substances that are particularly likely to bring about an allergic reaction. The main thing is to select the one designed for the type of protection required.

These creams, we have found, are often considerably abused. Men seem to think, in many places, that the cream has to be applied in a coating that by its mechanical thickness to the naked eye will protect the skin. I have seen a man put on a quarter of a pound where half an inch squeezed out of a tube would probably have answered the purpose.

In that case, they often run into other difficulties. Many of these creams which protect from oil substances, are creams which have a soap base; the men are simply running around in a soap poultice, and they work up an irritation which is as great or in some cases greater than that which would have resulted from the exposure they sought to prevent.

In the oily cream preparations which protect from water soluble substances, they offer us very queer mixtures. Lanoline as a base, I think, is the thing of choice for that type of protection, rather than a petrolatum. It works a little further into the skin, I believe, and will protect in a more thorough manner than the petrolatum base preparations which just smear over the surface and are more easily rubbed off and fail in their protection.

Another thing to consider is, that the last word has certainly not been said on protective creams; they are in the process of rather rapid development. I believe there are commercially available many suitable types of protective creams, and, on the other hand, they can be made up for a specific purpose very satisfactorily on the advice of your physician. You can get a very satisfactory cream that can be produced in bulk for your own use.

Respiratory Protection

CHAIRMAN JOHNSON: We will continue with the discussion of respira-

fury protection. In connection with the examination of thousands of foundrymen, Dr. Sander has explored the operations which they conduct so that he knows what they all mean. He of course has found that some of the men are protected by exhaust systems, and some of the men are protected by personal body protection, either filters or the airline type of respiration.

I interpret respiratory protection to mean the kind of respiratory protection that you stick over the nose. Of course, it [illegible] whether or not he has found by the actual examination of men that the satisfactory type of respirator has been found which will actually protect the men.

DR. SANDER: Beginning with sand blasters, undoubtedly the modern air helmet affords almost 100 per cent protection for the prevention of silicosis, provided the helmet is kept in good working condition, and prevents the of abrasive dust entering into the [illegible] respiratory.

In the examination of about 200 sand blasters in a recent case, I have yet to see the first one develop silicosis who had a helmet that was in good working condition. Also, I have seen no material disadvantage during a twenty-stage silicosis during that interval. A first-stage case has been kept at work; he has not been shifted.

We feel that a sand blaster with a modern helmet is breathing less dust than anyone else in the foundry, as a matter of fact, and there is certainly no point in shifting him out onto the floor, removing his piece of respiratory protection and giving him more dust than he is getting at his sand blasting job.

As far as the other foundry operations are concerned, of course it is always advisable to exhaust when possible. There are a few occupations that cannot be exhausted satisfactorily. One of these is sand chipping, and where sand chipping must be done, it is advisable for the chippers to wear the filter respirators. However, even there it is advisable to try some other method of cleaning the casting if that is all that is feasible—for instance, washing with high pressure combined water and sand, and so forth.

With ordinary stand grinding, there is no need of respiratory protection, provided an exhaust system is used and is in proper working condition.

The exhaust ventilation for swing grinders is a little more difficult, but it has been accomplished. There are very few swing grinders in Wisconsin that are exhausted, however. It has been our experience that swing grinders have not developed as much silicosis as was at first believed, and the reason probably is that by the time they get the castings there is no more molding sand on them. It has all been [illegible] so the only silica the swing grinder is breathing is generally plant dust.

Molders and core makers need no special respiratory protection, in my opinion. A molder just could not do the job very well if he were required to wear a respirator from morning until night.

I do not think I would depend on a respirator for the protection of the man with the tuberculous scar. I would rather move him to some other job, or move his job somewhere else, or handle the job in [illegible] I can see no reason why we should worry about a sand blaster scarred, even with a tuberculous scar. We feel they are not going to develop silicosis, and therefore we think that what little dust there may be will have no effect on such a tuberculous scar. We have not permitted sand blasters with tuberculous scars to continue working on that job, but I think we should permit them to do so today, knowing that the hazard of sand blasting is controlled provided, of course, the equipment is kept in working condition.

CHAIRMAN JOHNSON: That dissertation answers beautifully the question of respiratory protection as far as it applies to the foundry, and I think direct analogy will carry that opinion over into almost any other exposure that you choose to carry it into.

In order to play absolutely fair with everyone in the audience, I am going to start on the questions that have come to me, and there are quite a number.

Here is the first question: Assuming that the development of adequate engin-

...ering and medical departments in connection with the smaller plants, and if so, are they the smaller plants which could not afford to employ such men? Do they have a consultant fee connection or any other arrangement of that sort? It would be appreciated in many cases for those small plants to set up effective and economical control measures.

To lead the answer in a definite direction, I am going to suggest that perhaps the answer lies in the rapid development in almost every industrial state, divisions of occupational disease hygiene, either in the Department of Labor or the Department of Health. I am sure Dr. Leonard Greenburg would like to answer that question.

The Small Plant Problem

DR. GREENBURG: There are two things that the smaller plant may do; one is to make use of its insurance company to the fullest extent; and the second is to make use of such facilities as the state has at its disposal, either the Department of Labor or the Department of Health.

In approximately 30 states in the Union, there are divisions of industrial hygiene in either the Department of Labor or the Department of Health, and in a few cases in both, and they are always prepared and eager to help the smaller plant, particularly with such problems as this.

Many of the insurance companies have developed divisions of hygiene and have experts on their staff who are also prepared and able to render service along these lines. It seems to me that the biggest problem is to get the small plant management to recognize that the stumbling block is management itself. Once that recognition has been achieved, it is a relatively simple thing to obtain practically free service from either of these two organizations in an effort to really do constructive preventive work.

CHAIRMAN JOHNSON: Let me add one thought to that answer. I am familiar with most of those divisions. In none of them is there anybody carrying a big stick to browbeat or to hammer into shape the small plants that want help. They are already giving help in an advisory fashion.

There has been fear, at times, that you could not let a state man into the plant without getting into a controversy, [illegible] that many plants do not [illegible] national disease problem. I am not going to say that it does not exist; I will say I have not seen it.

I have been a question for our engineers. Yesterday they were talking about welding metal and fume there, and so forth. Here is the question: Does an exhaust system from electrical welding affect the type of weld?

As I view this question, it seems this: When you weld with an electric welding process using a covered electrode, the fusing of the melting produces an umbrella or tent over the weld are itself and thereby excludes the air from the arc and prevents oxidation of the steel which is being cast into the hole being filled up, and prevents oxidation of any of the material or metal that is in the fused state.

Now the question is, if you stick a heavy exhaust there and pull away that vapor which provides the protection, do you ruin your weld? Is the control for health at the expense of the weld, or would it be better to forget that and limit the time of the welding?

Does anybody here want to answer that?

MR. BONSIB: I think that if you have general ventilation there would be very little danger of destroying that umbrella that Mr. Johnson has mentioned. Of course, it is advisable to remove these fumes as near the source of origin as possible. You have to get within eight inches, and not more than that, to really get efficient results, and being that close you do not require more than 100 or 200 lineal feet per million.

I do not think there is enough cooling action to do damage. As a matter of fact, some tests we were interested in making seemed to indicate that there was no damage done. However, you come where the damage would be done if you exceed that, but I do not think you need to exceed 100 or 200 lineal feet per million. If you have general ample ventilation, then you do not have any danger, in my opinion.

CHAIRMAN JOHNSON: That seems to be a logical conclusion. It is certainly an opinion based upon observation of this

[illegible] aminations, an attempt on the part of the management to [illegible] the part of the [illegible] them in the [illegible] at full pay [illegible] they would not do it.

Fortunately, these conditions have changed, and the men themselves now appreciate these facilities when they are put in, and they generally demand them where they are not put in.

I think washing facilities are a most important factor in the control of occupational diseases, and a number of occupational conditions other than dermatitis. There are a number of companies where complete changes are furnished and those facilities are very largely a measure of prevention of occupational disease; and at the beginning of the day's work the men change to working clothes where previously that was not done.

Oil Dermatitis

CHAIRMAN JOHNSON: Here is another question:

"Is it not an accepted fact that oil dermatitis is more of a mechanical breakdown of the skin than it is a toxic problem? How would you overcome the desire of the employees to use abrasive cleansers on the hands?"

Cutting oils and other oils produce dermatitis, and represent three hazards. One produces a plucking of the hair follicles, which is largely a mechanical thing of rubbing oil and dirt, or what have you, into the skin.

Then we have what I think the doctors call heterothema, which is probably a chemical burn, an irritation of the skin which is another type of dermatitis. Then there is a third one, which produces blood poisoning or boils where the oil has been supporting an infective medium bacteria of some sort.

Can we solve that oil contact problem by handling the washing of men in a satisfactory manner through washing facilities, and the discouragement of the use of harsh abrasive soaps, or doesn't it make any difference?

May we have a development of that question from Dr. [illegible]?

DR. [illegible]: [illegible]

The easiest way is to [illegible] a [illegible] they will [illegible] themselves. If you leave it to them, they may purchase ones which [illegible] rapidly, but which may have irritating properties.

On the other hand, if the management supplies it, they can purchase one of suitable quality which in general may be of a more satisfactory type.

The whole problem of oil folliculitis and oil dermatitis can be handled and is handled in many plants on a very satisfactory basis, by these simple means, and so far as I can see does not present any insurmountable difficulties whatsoever. The usual defect in the system seems to be that the plant does not pay any attention to the problem until many of the men become infected and many of them have skins which are more or less ruined by an accumulation of oil and foreign matter in the pores of the skin.

At that time, preventive measures are no longer sufficient. It then becomes necessary really to cleanse the skin thoroughly and repeatedly so as to once again bring it back to its normal clean condition.

CHAIRMAN JOHNSON: Let us go over to the engineering side and talk on the industrialist who manufactures oils to provide himself a meal ticket and tries to prevent just this hazard from causing trouble.

MR. BONSIB: I agree with much that the doctor has said about getting good oil in the first place.

I think that one of the big causes (and I have studied this problem a lot for the reason that you hear many stories of injuries due to cutting oils) is that the oil

[illegible] the employer receives. The Wisconsin Industrial Commission recently published a declaration of principles on physical examinations in industry which everyone interested in this problem should see. In that it is specifically requested that employees be given a copy of the report which the employer receives.

That is not a complete record or report; it is merely a statement or listing of the important defects. I believe that it is as wrong to give employees complete reports as it is to give them nothing at all. A worker is not interested in what his blood pressure reading was yesterday or is today; he is merely interested in knowing whether or not it is significantly high, and that is all he cares about.

CHAIRMAN JOHNSON: Is there anybody else on the panel who would like to discuss the question?

MR. BONSIB: I think you can cause more unrest through fear, by failure to tell the man, than in any other way. He may imagine he has something, and he worries and worries and finally becomes a victim of what is known as autohypnosis, whatever that is.

I think by relieving his mind and telling him exactly what it is, you lift that worry from his mind, you ease his mind, all of which makes a better man of him.

CHAIRMAN JOHNSON: Now let us tackle another question: "Processing of a certain synthetic product involves overheating to a extension of .5 per cent formaldehyde gas is given off during the drying of cloth in the vicinity of the machine. How much formaldehyde would represent toxic proportions? And how could the quantity present in the air best be determined?"

Dr. Meiter, will you like to tackle that problem?

DR. MEITER: In my own experience, formaldehyde is irritating enough so that you would not require refined technical instruments to make determinations, because it is very easily noticeable in low concentrations. I think proper engineering methods could be devised for eliminating the fumes without using technical instruments, because it is necessary to keep the fumes down to very low concentration, otherwise a dermatitis may develop and also sore eyes.

CHAIRMAN JOHNSON: Does the medical side of our panel wish to develop that any further?

DR. CRANCH: I think that question illustrates one of the phases where it is not necessary to have engineering help in order to determine whether or not you have reached a point of safety.

Formaldehyde vapors are not likely to be toxic, since in a concentrated form it is so irritating that just for comfort some relief would be demanded, so that we need not be particularly concerned about what concentration is obtained.

There are a number of chemicals of that sort, where the immediate effects are so irritating that toxic exposure would usually be avoided in the course of ordinary good practice in handling the material.

CHAIRMAN JOHNSON: Warren Cook says he has another idea.

MR. COOK: [illegible]

DR. GREENBURG: [illegible]

CHAIRMAN JOHNSON: [illegible]

[illegible]

DR. CRANCH: [illegible]

CHAIRMAN JOHNSON: [illegible]

[illegible]

Metal Fumes Problems

MR. COOK: [illegible]

Now, assuming that the particular operation is one in which the man may be spraying lead, there are various methods using the ventilated booth. Let us assume for the moment that he is provided with no respiratory protection. If a man is spraying zinc and the booth is providing adequate exhaust so there is not much of a cloud of zinc and he does not get metal fume fever, it is probable that it is not necessary to make any determination for zinc. If during the course of the day the man is spraying some lead and some cadmium, I would feel very definitely that it would be well to run an electrical precipitator sample, analyze the sample, and obtain the electric precipitation for lead and also for cadmium which would be a routine chemical procedure, and the concentration of both of those should be kept below the suggested toxic limit in order to assure that you are on the safe side.

I would feel that it would not be necessary to analyze for zinc under these con-

DR. KETTER: I a
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CHAIRMAN JOH
specific answer to th

[illegible] a question in [illegible] medical [illegible] something [illegible] I take it from [illegible] problem of allergy [illegible] quick tests in [illegible] employment examination an employee's possession?

DR. [illegible]: In general, I would [illegible] be interested in conducting [illegible] of applicants for [illegible] where we have a known [illegible] the employee is being [illegible] produces an [illegible] is advisable to [illegible] tests are not 100 [illegible] and they are not absolute [illegible] have to be very carefully interpreted. [illegible] they are not an integral [illegible] preliminary agreement [illegible]. They might be quite [illegible].

CHAIRMAN JOHNSON: Then the [illegible] answer to the question seems to [illegible]

ADJOURNMENT

curately controlling time, temperatures and pressures. Sufficient mercury thermometers as well as recording thermometers are correctly placed and constantly checked to assure the maintenance of correct temperatures.

Each of these processing operations requires unusual care, extreme accuracy combined with adequate supervision and inspection to assure quality and safety of the product.

In spite of the utmost care, defects in workmanship and materials do occur in any manufactured article. These defects must be found before the article leaves the factory, therefore, it is necessary to minutely inspect each article, diligently searching for and rejecting defective merchandise. These inspectors, well trained, are paid a bonus for finding defects; however, as an added precaution, their workmanship in turn is checked by product quality inspectors to assure accuracy and efficiency.

The modern tire is only one important accessory for the car of today. The same painstaking care in manufacture, the same high regard for quality, the same precautions to assure the consumers' safety is a major part of every piece of equipment that is manufactured into each car. Tires are safe and automobiles are safe—if the person behind the wheel and in control cooperates by thinking and driving safely.

Quality control work in any manufacturing industry involves two major safety functions. The first consideration is the safety of the employee, to see that the operator is performing his job with the maximum degree of safety to himself, that the materials he works with, his tools or machines have no apparent functional defects that may be hazardous to safety. The second consideration, safeguarding the safety of the consumer by seeing that each operation is being performed correctly, being constantly alert to insure the observance of specifications in order that uniformly high quality, safe merchandise is produced.

Dusts in the Rubber Industry

By P. A. DAVIS, M.D., F.A.P.H.A.

Goodyear Tire & Rubber Co., Akron, O.

Dusts may be classified in two main groups:

1. Harmful; 2. Not harmful or nuisance.

When we think of this classification, we undoubtedly think of some type of pneumonoconiosis. However, I believe we must not base our conception of dusts on this basis, but assume that all dusts are detrimental to the human system as a whole when the concentrations are high enough. Whether the disability is due to a toxic condition or to a mechanical one, of course, depends entirely upon the nature of the dust. The conditions usually referred to as being of mechanical origin fall under that condition known as pneumonoconiosis with its various sub-divisions of:

1. Silicosis.
2. Siderosis.
3. Anthracosis.
4. Asbestosis.
5. Chalcosis.
6. Chalicosis.

The method of contracting pneumonoconiosis is by inhalation of the dust; however, all dusts do not cause pneumonoconiosis. The higher the silica content of a dust the greater the possibility of developing a fibrosis and the higher the percentage of crystal content the greater the irritation. The diagnosis of the type of pneumonoconiosis is based upon the following:

1. Past history and occupation.
2. Physical examination.
3. Clinical examination of sputum.
4. X-rays of lungs.

Since we have been studying the lungs of industrial workers by x-rays, there has developed an entity which should be termed the "Industrial Lung." This condition, I believe, should not be termed a pneumonoconiosis because it reaches a certain stage, does not progress any further and after several months to a year improves. There are no symptoms nor decreased capacity of the lungs. It is discovered only by a series of x-rays taken over a period of years.

The other conditions caused by inhalations of soluble dusts, metallic, like dust from silica, and metallic dusts have to be discussed under a specific condition; for example, lead poisoning is very frequently caused by the inhalation of lead dust; and many nose and throat irritations are caused by inhalation of insoluble dusts whose action is strictly mechanical. We therefore may also classify dusts as: 1. Pneumonoconiotic; 2. Non-pneumonoconiotic.

Some of the principal dusts or materials used in industry which fall under these classifications are as follows:

Pneumonoconiotic:

1. Silicosis (sandstone, slate flour, fuller's earth, Stoughton earth, infusional earth, rotten stone, any other clay with more than ½ of 1% silica, ground glass).
2. Siderosis—iron ores, iron oxides (nat.), iron sulphides (nat.).
3. Anthracosis—coal and carbon dusts.
4. Asbestosis—powdered asbestos, asbestos ore.
5. Chalcosis—copper ore and copper dusts.
6. Chalicosis—stone dusts.

Non-Pneumonoconiotic Harmful:

1. Lead dusts.
2. Arsenic dusts.
3. Chromium dusts.
4. Cadmium dusts.
5. Antimony dusts.
6. Radium compounds.
7. Alkali dusts.
8. Sulphur dusts.
9. Tellurium compounds.
10. Various colored compounds such as ultra marine blue, Prussian blue, lead chromate, etc.

Non-harmful but nuisance dusts:

1. Soapstone with ½% or less of free silica.
2. Zinc oxide and sulphide.
3. Barium sulphate.
4. Plaster of Paris.
5. Paris white—whiting.
6. Talc.
7. Mica—may cause a mechanical irritation.
8. Oxide of magnesia.
9. Titanium dioxide.

As we can see by this classification we necessarily must go back to our original classification of harmful, and not harmful; and I am convinced that while silicosis is one of our predominant conditions due to silica, there are many other conditions which are produced in the respiratory tract which are harmful to the individual.

The following are the most important materials used in the rubber industry which are in the form of a dust or powder and to which the individual is exposed. They are marked by the following letters—H, harmful; NH, not harmful; HT, harmful and toxic; HP, harmful and pneumonoconiotic; NHN, not harmful but a nuisance dust.

1. Talc soapstone with ½ of 1% or less SiO_2—NHN.
2. Starch and potato flour—NHN.
3. Zinc oxide—NHN—see chest x-ray.
4. Lead oxide, metallic lead dusts, lead chromate, and the various powdered lead compounds—HT.
5. Carbon black—NHN.
6. Rubber dust—finely divided dust from buffing process—NHN.
7. Sulphur—H, sometimes irritates nose and throat and occasionally produces a dermatitis.
8. Whiting—NH.
9. Barytes—NH.
10. Asbestine—HP.
11. MgO, and $MgCO_3$—NH.
12. Lithopone—NHN.
13. Red lead—HT.
14. High grade clay—HP if over ½ of 1% silica and dust count is over 5,000,000.
15. Corn starch—NHN.
16. English vermilion—HT.
17. Graphite—NHN.
18. Chromium oxide—HT.
19. Ultramarine blue—HT.
20. Titanox—NT.
21. Thermatonic blue—NTN.
22. Zinc stearate—NHN.
23. Aluminum—NHN, occasionally causes a mechanical dermatitis and irritation of mucous membranes of nose and throat.
24. Hard rubber dust—NHN.
25. Lime—H caustic. Produces dermatitis.
26. Various alkali dusts—H caustic.
27. Various chromium and cadmium dusts—HT.
28. Mica — NH — sometimes causes mechanical dermatitis.
29. Yellow oxide (Fe_2O_3), NHN.
30. Black oxide (Fe_3O_4), NHN.
31. Gypsum—NHN.
32. Casein—NH.
33. Wood flour—NH.
34. Prussian blue—HT.

35. Soap powder — irritant NH. Sometimes causes dermatitis.
36. Captax—NH.
37. Phenyl—Beta Napthylamc—HT, causes a dermatitis.
38. Soap bark—NH, sometimes causes a little coryza and conjunctivitis.
39. Cotton lint dust—NHN
40. Bronze powder—HT—ac to copper and lead content.
41. Zinc sulphide—NHN.
42. Sand—HP.
43. Various clays having more than ½ of 1% of free silica—HP.
44. Antimony oxide—HT.
45. Titanium oxide—NH.
46. Various inorganic and organic chemical compounds in powdered form often produce dusts during their use and manufacturing. These must be considered individually as to their industrial hazard and toxicity and are not in the scope of this paper.
47. Wheat and potato flour—NHN.

The following procedure will be helpful in solving your problem of dust.

1. Make repeated dust counts of the working area at various levels.
2. Obtain some of the dust and send it to the laboratory for complete analysis including the determination of free SiO_2.
3. Examine the workers, x-rays of the chest for those working in pneumonoconiotic dusts.
4. Check the ventilation and increase it to produce non-hazardous atmospheres.
5. Differentiate between conditions caused by volatile substances and solvents, and those caused by dusts.
6. Protect the workers with proper clothing and protective respirators and masks.
7. Study the particular dusts from the mechanical and chemical nature and if the effects are unknown, resort to animal experimentation.
8. If dusts are toxic and harmful consider the possibility of a substitution for a non-harmful substance.
9. Examine and x-ray all employees who are being placed on jobs where there is a dust hazard. They should be examined periodically.
10. Make each dust problem an individual one, and in case of silicotic dusts, keep the counts below 5 M. per cu. ft., if the free SiO_2 is more than 1%.
11. Select employees free from TB, chronic bronchitis, post influenzal infections, post pneumonic conditions, asthmatics, and persons with myocardial involvements for dusty operations.

I have found that there is x-ray evidence of tuberculosis in about 2 per cent of the cases but only ½ of 1 per cent active and of a permanent disability. Uncomplicated pneumonoconiosis of a moderate degree is not disabling to a point of permanent disability.

I want to present to you a case which I think is a rare one. This employee has never worked in any dust before his employment on his present job. He has worked for 12¼ years in zinc oxide dust and during our periodic examinations in 1938 the x-ray picture proved very interesting. He does not have a definite pneumonoconiosis but he shows evidence of glandular fibrosis. What will develop in a few more years will be shown by x-ray examination only. He has no symptoms. If this man had been working in lead or similar toxic dusts, symptoms of that particular substance would have been present.

The dust counts on toxic dusts must be kept at a minimum, and much lower than that for silicotic dusts. In silicotic dusts the particles of 10 micron size or larger are of very little concern, but with toxic dusts the size of the particles is not so important as is the number of particles. The smaller the particles of dust the less the rate of settling and the greater the time of exposure, and this is the important item in toxic dusts. For example, the permissible amount of lead dust is approximately 15 mgs. per day of eight hours. There would be very little chance of any one ever developing a pneumonoconiotic condition with this dust count, but if it is increased very little there is a chance for lead poisoning, and so it is with the various toxic dusts.

The question in most of your minds is, "What are you going to do about these conditions?" The answer is simple. You are going to correct them. It has been proved many times that it pays big financial returns, creates better working conditions, and the employees have a more efficient and appreciative attitude for the employer.

It is unnecessary for me to consider the methods of correcting the dust problems for this is in the realm of the ventilation engineer, but you must insist that the ven-

situation be sufficient to reduce the dust count to a certain point and have it maintained at that point.

You should periodically examine your employees according to the type of dusts exposed to and as a suggestion the following is a schedule which I have used for a few years.

Silicosis or silicotic dusts—six months including x-rays.

Non-silicious and non-silicotic or non-toxic dusts—every year, with x-rays.

Toxic dusts—for example lead, chromium, arsenic, antimony, phosphorus, chemical dusts, and alkali and caustic dusts—every month.

Nuisance dusts—every 1 to 1½ years—x-rays only if indicated.

If you find any evidence of trouble it is better to correct the cause than to transfer the employee elsewhere, for this often causes dissatisfaction and suspicion. All such conditions can be controlled if there is cooperation between the medical, engineering and managing departments. In most states at present all conditions caused by dust are compensable, so it behooves the employer to correct his working conditions to a point at which there are no hazards.

Conclusion

It is impossible to give a detailed description of all the dusts used in the rubber industry, for the silicotic dusts alone would require a volume to do them justice, but I want you to remember that there are just as many serious conditions which may develop from the inhalation of various toxic dusts.

These conditions are often more serious than pneumonoconiosis and develop much faster and in a shorter period of time. For instance, a person may develop a lead poisoning in two months from inhalation of lead compounds and it might take five to ten years for a silicosis to develop in the same environment of silica dust.

There are on the market today many fine and efficient protective devices such as chemical protective masks, dust respirators, positive pressure masks, clothing and gloves which if used will give good results.

Instruction to the employees by the supervision in regard to their personal habits, their instruction concerning the type of dust they are exposed to, and why they have to use the protective appliances, will reduce the possibility of any trouble to a minimum.

All laboratory work must be done by a technician who has been trained in the various toxicological laboratory techniques and the interpretations must be made in conjunction with the past history of the individual. May I say in conclusion that it is much more profitable to correct a dusty operation than to declare it a hazard.

Training Supervision in Accident Prevention

By JOHN J. LOGE

Employment Manager, The General Tire & Rubber Company, Akron, Ohio

As we scan the history of the safety movement, we find that a great deal of emphasis has been placed on the foreman's responsibility in accident prevention work. Authorities seem to agree that foremen (and by foremen is meant direct supervision) are very largely responsible for the prevention of accidents in industry.

How do these authorities arrive at their conclusions? Why must the foremen assume the responsibility for injuries to persons under their supervision?

When we tell our supervisors that they must accept the responsibility for accidents occurring in their departments, we must be prepared to state a few reasons. We ask a foreman for a report following an accident, and he has a right to a clear understanding as to the reason why he is called upon to explain when one of his workers is injured. There is nothing mysterious about the placing of responsibility for accidents. It isn't the case of management imposing a burden upon supervision that should belong elsewhere.

As soon as a person is placed in a supervisory capacity, a position where he has charge of the work of others, he becomes directly responsible for their conduct and

Steam Railroad Section

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TUESDAY AFTERNOON SESSION

October 17, 1939

The opening session of Steam Railroad delegates was called to order by E. L. Henry, Assistant to the General Manager, Chicago & North Western Railway Company, Chicago, who presided. Chairman Henry welcomed the delegates, sketched the program of sessions briefly, and then introduced the first speaker.

Safety Today and Tomorrow on American Railroads

By CARL R. GRAY, JR.

Executive Vice President, Chicago, St. Paul, Minneapolis & Omaha Railway Company, St. Paul, Minn.

There is one thing in which I will not take a back seat for anyone, and that is the interest I have in "Safety." Perhaps it is partly from inheritance that I gather my interest in this work—perhaps from the environment and association I have had with men who believe in safety, who preach it, and who practice it constantly. Perhaps it is from the standpoint of realization that it is one of the greatest factors in the solution of the transportation problem. But whether it is one or the other, or a part of all, I know that I am definitely, completely and wholeheartedly devoting a considerable portion of my life to the improvement—by safety—of the lives of all of our people.

Naturally I should be most interested in the safety performance of the Omaha Railroad; but one cannot be safety-minded and fail to recognize and be interested in and a part of safety as it is understood in the business world today. One has but to look at the program of this Congress to realize what a tremendous place safety has taken in the lives of the American people, for it permeates the very souls of so many of us. It is, and has been, a complete success.

I read all I can concerning early American railroading. Here is a clipping from an English newspaper of March 6, 1869, quot-