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NATIONAL SAFETY COUNCIL

TRANSACTIONS

33rd Congress

1-2

1944

NEWARK



TRANSACTIONS

33rd NATIONAL SAFETY CONGRESS

General Subject and
Industrial Sessions

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Foreword

VOLUME I

THE Transactions of the 33rd National Safety Congress and Exposition of the National Safety Council are published in two volumes. Volume I contains the General Subject and Industrial Section sessions. Volume II contains the Traffic, Commercial Vehicle, Transit, School and College, Home, and Farm Safety sessions.

The Transactions are a record of the proceedings of the Congress, condensed and edited for reference purposes. They are therefore an abridged version of the papers and discussions. The original manuscripts, some of which have drawings and charts too expensive to reproduce here, are available 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. However, it cannot accept responsibility for all views expressed, either in the discussions of the Congress itself or in this record of them.

Extra copies of Volume I may be obtained by Council members at $2.50 each. The price to non-members is $5.00 each. Extra copies of Volume II are $1.25 each.

THE NATIONAL SAFETY COUNCIL, INC.
20 North Wacker Drive
Chicago 6, Illinois

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Using the Transactions

Each edition of these Transactions is a library of safety experience. Hundreds of men and women—leaders in industry, transportation, insurance, and governmental agencies—give the best of their knowledge and background to the cause of accident prevention at the Annual Safety Congress.

This knowledge and experience, accumulating year after year, is of great value to progressive industrialists and businessmen.

Plan of Arrangement

Safety ideas, topics, and problems, as well as personalities important in the field of safety, can be found by reference either to the *Table of Contents* or to the *Index* at the end of the volume.

The *Table of Contents* lists (a) General Sessions, (b) Subject Sessions dealing with problems common to many industries, (c) Industrial Section meetings.

Subject Sessions and Industrial Sections are arranged alphabetically. In the body of the book the several meetings of each Industrial Section are printed as they appeared in the daily time schedule of the original program.

The detailed alphabetical *Index* makes it easy to find specific safety material. It lists hundreds of items in three ways: (a) subjects discussed, i.e., absenteeism, dusts, safety shoes, welding; (b) speakers in the case of formal papers. Speakers' names are printed in italics; (c) Industrial Sections, i.e., Chemical, Construction, Food, Marine, etc. Under each Industrial Section are listed the subjects of its complete program.

Use the Transactions . . .

. . . To solve accident problems of foremanship, protective clothing, dermatitis, welding operations, ventilation, substitute materials, and many others.

. . . To aid in meeting such special war problems as off-the-job accidents, war conservation of personal protective equipment, wartime fire protection, and women in war industry. These subjects receive special emphasis in these Transactions. The Early Morning Sessions (Man to Man on the Job) stress the proper approach to employee training problems faced by all expanded industries.

. . . To obtain speech-making materials for the safety director or business executive who plans to speak on accident prevention. In addition to facts and authoritative opinions, this book contains many splendid examples of safety talks which can be used as guides or models. In addition, much of the material can be used in local publicity, plant publications and bulletin board announcements.

. . . To learn the points of view held by the leaders of the safety movement. These leaders, as officers or members of the Council's Industrial Sections, or as public officials, contribute ideas which can be used in the organizing of safety programs.

. . . To gain a better understanding of the National Safety Council's services and the national safety program. A survey of the material contained in the Transactions will supply the reader with increased knowledge of the growing power of the safety movement and of the means by which this power is expressed.

Many new people have begun to work with Fiberglas in recent months. By reviewing the record, this summary will help answer their questions.

Selection and Use of Personal Protective Equipment

E. E. WHITE
Safety Engineer, Sun Shipbuilding & Dry Dock Co., Chester, Pa.
(Paper Presented by Lt. Com. Carter Kendall)

The selection and use of personal protective equipment is a subject with which we all are familiar, but with the terrific expansion of our shipyards during the war, naturally came the increased hazards. In the early months of 1943, in just a little over a year, our shipyard had grown from 8 shipways, 2 dry docks, and 3 wet basins, to the amazing size of 28 shipways, 2 dry docks, and 12 wet basins. We jumped from 6,000 employees to 36,000 employees. I mention these figures to give you an idea of what it really meant to make a proper selection of protective equipment and then educate the employees in its use.

This subject of the selection and use of personal protective equipment must necessarily be prefaced by the development of the employee, in whose behalf the selection is made. At times it seems impossible to educate the present employee to the use of protective material. Due to this condition, I feel that industries have a great opportunity to select and develop a useful and intelligent personnel and many are doing just this.

A new applicant coming to the door of the Employment Office has or has not the necessary physical and mental requirements to successfully fill a job with credit to himself and to the industry. It is at this point where management steps into the picture, and, through its organization, can really do something constructive for itself and the applicant.

I will try to develop this employee in the next few minutes, into the man all safety engineers like to work with.

Always an Unknown Quantity

The applicant is an unknown quantity when he fills out his application for employment and presents it to the interviewer. The first step in his industrial career has then begun. The interviewer must be of high calibre, familiar with the physical and mental requirements of all the crafts in the industry. It is a very serious business, one that will produce either a liability or an asset for both the employee and the management.

If and when the interviewer has decided that the applicant is probably a good risk he approves him for an aptitude test. I feel that the employee of today, unfamiliar with shipbuilding crafts (having come from an industry of unrelated character) needs a test to give us some idea of his latent skills. Through choice or by compulsion this employee has given up his job in non-essential work, and definitely needs the protection of the industry into which he is coming. I feel then that the first two steps, the interviewer and the aptitude test, are very much in the category of personal protective equipment, already in the possession of many companies. In our yard, we know that protective equipment cannot function 100% when worn by a man or woman who has been misplaced.

The next piece of equipment furnished by the industry is the physical examination. Regardless of what the interview or the aptitude test has shown, the applicant's qualifications may be off-set by this examination. Certainly, his health should be the concern of the industry.

When the interviewer, the aptitude test and the physical examination have placed the applicant in the proper position, industry has used the equipment necessary for their protection as well as that of the employee. In the selection of the personnel who interview, give the aptitude tests and examine the applicants physically, great care should be taken that only the best equipped men available be procured for these positions. Then industry must insist on the use of this equipment.

The employee is now on the payroll, but

he must not lose his identity. Industry has so much protective equipment yet to offer. The newcomer looks forward to what he hopes will be long and profitable employment, and industry without a doubt cherishes the same idea.

Equipment Overcomes Fear

It is not long until the employee begins to think of what will happen to him in case of injury and sickness. Protective equipment has been set up to overcome this fear; compensation, hospitalization, insurance, and benefit funds.

We can't stop here, because the identity of the employee is not yet fully established. He has not really become one of the big family until he finds himself bathing in fine shower baths, dressing in sanitary lockers, eating nutritious food in well-run cafeterias and, if injured, receiving the expert attention of competent doctors and nurses in up-to-date dispensaries. These items are protective equipment for both management and the employee.

There is still another factor, which provides a most important milestone on his road to success. Can we expect the employee to remain contented forever at the same job and the same pay? Industry does not want him to, so it provides schools and proper supervision.

All the protective equipment to this point has been to properly place an employee in a congenial and remunerative position, to take care of injury and sickness, and to build in him a pride of his job and the industry through the establishment of the proper facilities.

There is still one vital piece of equipment used by industry that is most essential, and that is the social and athletic activities fostered by industry and made possible by the employee.

During these days when so many employees are separated from their families by great distances, the joys of living are few and far between. Life must be made bearable for these men. The Service Organizations realized the servicemen's needs when they organized their clubs and encouraged entertainers to visit the battle fronts and camps. However, someone has failed the home front soldier. Here was a tremendous opportunity, but most communities failed miserably to provide the facilities to make life pleasant for the dislocated workers in essential industry.

Therefore, industry itself called upon its final protective equipment. It sponsors bands, picnics, concerts, dances, and athletics. The employee now has become one of the family, and unless he is beyond the salvage point, he should be happy.

I come now to the material equipment, which is supplied for our workmen by our Safety Equipment manufacturers. I have often wondered just how these men, who manage the Safety Equipment business, got into this line of work. At first, I felt it must be through their experience in industry that prompted them to establish their concerns, but after talking to a considerable number of our manufacturers, I found it was through the compulsory law passed by the various states for the protection of their industrial citizens.

Equipment Must Be Used, Too

The problem of the Safety Engineer is how to select the best equipment for the respective problems, and then educate or enforce the use of this equipment.

In the earlier part of this paper I tried to develop the ideal employee, and now that we have him, the obligation to protect him becomes paramount. We must protect him against blindness, deafness, tuberculosis, silicosis, burns, broken bones, sprains, heat exhaustion, strains, sickness, and last but not least death.

Let us look at the equipment.

There is to my knowledge sufficient goggles of all types on the market to meet every hazard. The grinder, the buffer, the welder, the driller, etc.—all can have full protection.

The hearing has been protected with ear plugs of good quality.

The body can be clothed with leather, fire resistant materials, heat resistant shields, leggings, spats, gloves, and safety shoes.

There are wooden shoes, knee pads, breast protectors, safety helmets, etc.

There are respirators for dust, lead and zinc fumes, paints, etc.

There are masks to enter explosive mixtures, fires and smoke.

Apparently there is no end to the ingenuity of the manufacture of safety equipment.

To select the proper equipment and use it to the best advantage is the problem. Who should make the selection? The only man who does know, or should know, is the Safety Director.

When the equipment is delivered, then—the fun begins. Are the methods for its use to be compulsory or educational?

I believe in the educational policy in normal times, and the compulsory policy in times of emergency.

None of us like compulsory tactics, neither does the soldier like discipline. The soldiers, however, through discipline and education, are winning the great victory against our common enemy, and I see no way to win the war against industry's common enemy, "accidents and death," other than through a combination of education and discipline.

I feel an ample supply of material should be made available to the employee. The equipment supplied to the workmen, such as safety helmets and goggles, should be handled through the tool rooms, while leather clothing, safety shoes, work gloves, overshoes, etc., should be sold at cost through safety stores.

During the year 1943, our two stores furnished 35,000 pairs of safety shoes; 187,000 pairs of work gloves; 52,000 pairs of welder's gloves; 10,000 pairs of overshoes; 2,500 rain coats; 1,000 pairs of knee pads; 5,200 leather jackets and 2,200 leather overalls.

Our tool rooms have in circulation 12,000 pairs of goggles of all kinds, not including shields of all types and 15,000 safety helmets.

We advertise these stores in our yard magazine. Whenever an employee is hurt because of the lack of this equipment, we make an issue of it.

If Messrs. Shipman, Gaskill and Gass will come to the platform, we will dispose of the questions and answers and close this paper.

Questions and Answers

Q. In scaling inside of tanks (even after they have been gas freed after carrying hi-octane gas) the removal of the scale frees additional gas. While this it not an explosive mixture, men get headaches and become nauseated. Is there a respirator that will solve this problem? If not, how would you handle it?

A. The Ethyl Gasoline Corporation has issued instructions stating that all men entering tanks that have contained leaded gasoline be equipped with blower type air line hose masks as well as special coveralls, acid proof gloves, rubber boots, etc.

Q. When a blacksmith works on white hot metal, using a flatter to mold the piece, what can he use to protect his face, arms, body and legs, and still be able to work?

A. A cellulose acetate face shield about 6"x9" window, .060 thickness—light green shade to protect from glare. Heavy woolen shirt with sleeves rolled down or a pair of chrome leather shoulder length sleeves. Another suggestion would be the use of welding cape sleeves of chrome leather. A split chrome leather apron, divided at crotch and attached to the legs with adjustable fasteners, permitting freedom of legs. The size of apron to be 24" wide and ending about 8" below the knee.

Q. A fire in a cofferdam has burned 1500 feet of hose. The smoke is very heavy and the heat intense. What mask should a fireman use to enter the cofferdam?

A. Self contained oxygen breathing apparatus should be worn, and I would recommend that two men equipped with self contained oxygen breathing apparatus enter the cofferdam each with a life line and that two men be assigned to remain outside and handle the life line.

Q. Every day thousands of electric bulbs are broken. Is there an instrument devised to remove broken part from the socket that will avoid shock?

A. Use what is commonly known as a lamp base remover. This device is made up of a wooden handle in two sizes, six and nine inches in length. The six inch size is used for medium or standard screw base and the nine inch size for Mogul screw base, which is the larger size of lamp base. At the contact end of the handle a recessed molded piece of rubber is attached. This molded piece of rubber has slight ridges and is tapered to enter the inside of the base of the broken lamp. The contact end of the handle and the rubber part is recessed to fit over the center glass filament base of the lamp. The tool is inserted into the broken lamp and the base is removed by friction grip; even though the current may be on, the rubber insulates against electrical shock. It is understood the workman should wear goggles as additional protection from possible broken glass.

Q. Must all goggles, respirators and gas masks meet certain standards and be stamped as approved for industrial use before they may be sold?

A. Safety goggles should comply with standards as set down in the National Head and Eye Code and the requirements of Federal Specifications. Respirators need not necessarily meet requirements of specific bodies, such as the National Code for Head, Eye and Respiratory Protection, Bureau of Mines Standards and Federal Specifications except where such devices are used against exposures of toxic atmospheres in which definite requirements are set down by specific bodies as to their design and filtering efficiencies. On nuisance dusts or dusts of a non-toxic nature, it is not necessary to have devices meeting the requirements of the above mentioned bodies. Gas masks are required to meet the specifications as established by the U. S. Bureau of Mines.

Q. In shipyards, what is the best helmet to use, a brimless one or one with a brim? Is there any way by which a man wearing a helmet can keep his head warm in winter weather?

A. Most manufacturers can supply either a cap type brimless helmet or one with a brim, both of which will give the same amount of protection as far as the crown of the helmet is concerned. There is no doubt, however, that the helmet with the brim will give added protection to the man's neck and ears in case of falling objects. Some yards have found, however, that with men working in confined spaces the cap type helmet is more satisfactory due to the fact that it is rarely accidentally knocked off, while the brim type may get in the way in very confined quarters. For this reason some yards use both types depending on the particular operation. Most manufacturers can supply winter linings for use with the protective helmet and will not only keep the man's ears warm but also his forehead, temples and the back of his neck. The practice of wearing a felt hat or woolen hat beneath a protective helmet will place the helmet too high on the man's head with a possibility of it being knocked off.

Q. What filter type of respirator should I use in the following jobs: (1) working in lead or zinc fumes (2) cleaning castings (3) using radiax saw (4) grinding tools on the emery wheel (5) in presence of smoke?

A. (1) U. S. Bureau of Mines approves "Type B" mechanical filter type metal fume respirator.

(2) Type A approved mechanical filter type respirator.

(3) Type A approved mechanical filter type respirator.

(4) Type A approved mechanical filter type respirator.

(5) The use of a filter type respirator for protection from smoke is not recommended.

Q. Do the filters on air line respirators completely eliminate all harmful substances in compressed air?

A. Most air compressors use oil for lubricating the cylinders and oil mists and vapors will get into the air during compression. If a compressor overheats, carbon monoxide may be formed. A good air filter filled with activated charcoal will remove the oil, water, and pipe scale, but not carbon monoxide.

In connection with their approval of supplied-air respirators, the U. S. Bureau of Mines says—"It is the responsibility of the user to provide respirable air either by a compressor that does not use an internal lubricant that could produce gases or mists that may be objectionable or injurious to health, or by one that is protected by suitable filters, temperature regulators, and alarms."

A carbon monoxide alarm is available which can be installed to continuously sample the compressed air supply and give an audible warnings if carbon monoxide is present. Blowers or compressors are available which do not use a lubricant in the compressor, and these are recommended as an air supply to masks or respirators.

Q. Is an electric arc more intense at night?

A. There is no variation in the intensity of the light source of an electric arc at

night over that of the day, however, due to the pupils of the eye being open wider at night, there is a greater amount of the light in the arc brought into the eye, where night or general low light intensity are worked in.

Q. A crane operator working at night finds flash goggles too dark to see certain spots due to the lighting, yet his eyes get sore. What is the solution?

A. Naturally, you would have a check made to determine that the lighting is adequate and properly distributed.

If a crane operator's eyes are normal, try lighter shades of filter lens. A lighter shade would probably give you the right answer.

Q. To what degree does flash glass absorb ultra violet and infra red rays?

A. So-called flash glass or high visible light transmitter filter glass of standard quality, such standards being established in relation to requirement of the National Head and Eye Code and Federal Specifications, has an absorption in the ultra violet of practically 100% and in the infra red field from approximately 80 to 95%.

Q. Welders claim flash glasses plus the glass in the shield make the work too dark. He needs glasses because he works close to other welders. What is the solution?

A. In arriving at the density or shade number of the welding glass in combination with his flash glasses, it would be to his advantage to have a set of glasses which include flash glass and the welding glass of which the combination is equal to the of his welding glass. This can be determined practically by adding the shade number of his welding glass to that of his flash and subtracting the numeral one from the total of the two glasses.

Grounding of Portable Electrical Equipment

By HARRY W. NELSON

Elec. Foreman, Pullman-Standard Car Manufacturing Company, Chicago

I was asked to tell of our experiences and of methods used in the grounding system for all portable electric hand tools and appliances at our plant. While we have not had any serious accidents from electric shock at our plant, we did have several complaints from men working with portable electric tools that they were getting shocks from their machines. Notwithstanding the fact that we are prone to discount such complaints, we know that it takes only a very small amount of current to produce serious results. In 1942 at our parent plant, the Pullman Car Shop, one man who was using a portable electric drill while working on a car received an electric shock that knocked him from the platform on which he was working, breaking his arm and causing an 8 week time loss accident. So with that and other instances in mind, the Safety Department pushed the grounding of these tools and kept after it until authority was issued to do the job that cost approximately $10,000. The untiring efforts of our Safety Department and the willingness of the management to cooperate, enabled us to win, along with other awards, the coveted Admiral Land Safety award that he have received.

At the Calumet Harbor Shipyard, we are serviced by the Commonwealth Edison with 12,000 volts Primary stepped down to 4 at our switchboard; from there it is distributed to the various ways, docks and building in duct way under ground. All our 440 volt equipment is grounded, if it is portable; a 4 wire cable or cord is used all the switch and fuse panels, receptacle outlets and connecting conduit, are grounded at each location.

The lighting current is obtained from phase transformers connected 480 Volt Primary to 208 Volt Sec.—120 volts any phase to neutral and the neutral is grounded at each transformer; also all conduit fuse panels and receptacles are connected to ground.

For welding circuits, each way and dock has a complete ground tie-up, so that welding machines may be disconnected and moved from any location without disturbing the ground clamps on any ship. Then, of course this welding ground is, in turn, grounded so as to prevent any shock from the welding current as these ships are set on wooden blocks. In connection with the grounding of the A. C. side of our welding machines, I would like to call attention to a special feature that we, at Pullman, use, and that is an instantaneous trip-relay, the current coil of which is hooked in series through the ground wire and the relay contacts are in series with the operating coil of the motor starting switch. This affords us the necessary protection for the A.C. side and, at the same time, protects the power cable from heavy welding currents that are likely to be carried over the ground wire should the welding ground become loose. With this ground hookup the resistance to ground from our panel boxes or from the power and light receptacle boxes on the ways and dock is approximately 5 ohms which I am sure provides us with a ground that meets safety requirements.

This has given you a picture of the main and service layout on the ways and docks; from here we go into the ships. On the 440 volt power receptacles no changes were made as they were 4 pole, one grounded, these being used for welding machines and ventilating systems. However, for lights, the receptacle previous to change-over was three pole, 1 being neutral and 2 for 1 phase of the lighting circuit giving us 2 120 Volt circuits at each receptacle and these two lines fused with 60 amp. fuses. Each ship requires three of these feeders or 6 circuits, and about 120 lamp outlets, of which 100 are 100 Watt lamps and the balance 200 Watt lamps set in places where a little more light is needed. Also, each ship is provided with from 15 to 20 portable receptacle boxes, each box having four Duplex outlets or 8 outlets. These boxes are accomplished with flat plug boards and jacks. The feeder circuit coming into a ship may have two or three plug boards, and, from these, several circuits of lamps and receptacle boxes are taken by means of jacks. These jacks are fusible and are fused with 30 amp. fuses; then the receptacle boxes are fused with 15 amp. fuses. Therefore, each ship has 6 60 amp. fuses, about 20 30 amp. fuses and from 60-80 15 amp. fuses. Now with 16 ships under construction on the ways and always at least five ships (and most of the time more) in the water at the docks, you can get a glimpse of the job to change this all over from two wire to three wire lines together with about 400 portable electric tools and from 1000 to 1200 extension cords, and see that we did not interfere with the production schedule. This meant changing all the three wire feeder circuits into the ships to 4 wire, changing all the jack circuits to 4 wire, and carrying the ground wire to all portable receptacle boxes. To connect this ground wire, brass plates were put on the flat plug boards and mating plates on the jacks so that the ground wire from the receptacle at either the dock or way was carried all the way through the system to the farthest receptacle box on any ship.

Our first move was to make up several new 4 wire service feeders with grounded flat plug boards and then exchange them for the old three wire ones. We then revamped the old ones until all service feeders were changed. Then we started with the jacks and changed them over until all circuits were complete with ground to all portable receptacle boxes. Now with this done, it was time to start on the portable tools themselves. For these we made up all three wire cords with three prong plugs attached and the other end prepared for a quick attachment. Over a weekend our entire electrical force was brought in to change all the cords on the portable tools and the receptacles in all of the portable boxes.

After this installation was finished we took meter readings of the resistance and checked from the portable tool to ground and we found that the resistance is 1 ohm. These checks of resistance are made frequently on various ships. Also a visual check of wiring is made constantly to see that our men are keeping this Safety item on their minds at all times. Also the maintenance of the portable tools themselves is a steady job, for they require frequent inspection and constant care.

health programs are: certain changes in operating conditions made necessary by the war effort, the employment of physically handicapped workers and increased working periods.

The section has enjoyed a growth in membership. This increase was made possible through the excellent cooperation of members of the section. The suggestion has been made that under the direction of the membership committee chairman, certain members of the section be asked to serve as special representatives in various parts of the country for the purpose of maintaining closer personal contacts with prospective members. It is my opinion that the adoption of this plan will result in further gains.

Off-the-job safety has now been given a definite place in the accident prevention program of many of our member organizations. An effort is being made to obtain reliable statistics regarding the comparative frequency and severity of off-the-job and on-the-job accidents. More records and reports of this type will give us the basis for improved remedial procedures.

Asks Poster Suggestions

Posters play an important part in our accident prevention programs. The problem of maintaining a continuous supply of effective posters is great enough to require the cooperation of all members. Let me urge that you send to the committee sketches or photographs illustrating the points that should be emphasized.

A new sound slide film, sponsored by the Metals Section, has been prepared and is now available. Its title is "Giant Hands of Industry" and it shows recommended safe practices for hookers in overhead traveling crane operations. The film was prepared under the immediate supervision of members of the Metals Section and I am sure it will play an important part in your safety training programs.

This year's sectional congress program has been designed to cover with maximum effectiveness, in the time at our disposal, a wide range of interests. You will find that without exception the speakers you will hear meet the two essential requirements, that is, they know their subjects and they know how to tell what they know so that you and I can use it in our own plants. I am sure that the discussions are going to be intensely practical and I know that we shall enjoy them and profit from them.

The year ahead offers us a challenge and an opportunity. One of our major responsibilities will be to give all the help we can in the placement and re-training of employees returning from service in the armed forces. Some of them will return to industry with new skills, capable of filling more responsible jobs than they had before. Those who have been in the thick of the fighting may have physical or emotional handicaps which must be taken into account. Whatever the problems may be, these people deserve every consideration we can show them, and we should spare no effort to make their return to industry as easy and as pleasant as possible. Through good orientation and adjustment programs we must see that they are assigned to suitable jobs and adjusted to organization policies and methods. The necessary pre-placement and in-service training must be provided so that the transition from war to peace-time occupations may be made quickly, easily, and effectively. The safety department should play a prominent part in this readjustment period.

Reconversion from war production to civilian production will also bring with it problems for the safety department. In the reassignment of workers to former jobs and in the adjustment to new types of jobs, safety must be kept constantly in the foreground. We must make certain that the training which will be necessary for a large part of our personnel includes adequate safety instruction, and that a continuous follow-up on safety is made a part of the plant supervisory program.

I want to express to you my sincere appreciation for the opportunity to serve as Chairman of the Metals Section. It has been a pleasure to work with you and I am deeply grateful for the excellent cooperation you have given me. With a continuation of the loyal support you have given in the past, the section will move forward in the future to greater and greater accomplishments in the field of safety.

WEDNESDAY AFTERNOON SESSION

October 4, 1944

Presiding: L. S. Adam, Personnel Supvr., Continental Foundry & Machine Co., East Chicago, Ind.

Safe Foundry Practices—Pouring—Shakeout—Cleaning

By H. A. FORSBERG

General Superintendent, Continental Foundry & Machine Company, East Chicago, Indiana

I shall cover principally dust control, housekeeping, pouring, shakeout and cleaning as applied to the Steel Foundry Industry.

Dust Control

We have gone through the regular cycle of safety equipment covering the following: shoe guards, safety shoes, asbestos clothing, latest type sand blast helmets, etc., and have also kept abreast of the times in connection with the latest design mechanical devices, some of which are as follows: Sand mills used for mixing sand are now entirely enclosed with dust collecting systems attached. This prevents particles of silica flour and various types of binders being dispersed through the air. All sandblasts are equipped with latest type ventilating and collecting systems, operators are provided with washed air helmets and metal shot is used in blasting operations. Numerous foundries have, in the first few years, installed a wet collecting system, rather than resorting to the dry or screen type collector. This is a definite improvement over previous methods.

Proper disposal of dust from the various collectors should be given definite consideration. Accumulations removed from wet collectors is in the form of a sludge and presents no serious problem in disposal except during the winter months when excess water drainage has a tendency to freeze around the loading zone. Accumulations removed from dry collectors can be readily moved or transported if wetted down.

We also have a collecting system for cleaning molds and specially designed equipment is utilized for siphoning particles of sand through a vacuum system and collector. Dust collectors are connected to shakeout grids for small and medium sized castings; our shakeout operations for large castings we use combination air and water spray system placed at points where molds are shaken out and we find that this definitely assists in controlling dust from this operation. We also use this mist spray at our sand reclaiming units.

All stand grinders are equipped with collector systems so that grindings from wheels are properly collected.

Considerable work has been done in the way of concrete and block flooring, rather than sand floors, which has improved the housekeeping situation.

We have large fans and man coolers in various departments in order to continually change the air and these fans are directed generally toward the ventilators.

The use of compressed air for cleaning is discouraged and the use of a vacuum system and brushing encouraged for dust control. Foundry floors are water sprayed several times each shift.

One item which may seem insignificant is that of the purchase of ground silica (220 mesh) in bags, rather than purchasing in bulk, making the unloading cleaner and facilitating unloading operations.

Housekeeping

It is our opinion that good housekeeping is a barometer of a safe place to work and reflects the quality of the product manufactured. In order to maintain a good safety record, we believe it is necessary to observe good housekeeping rules. Aisleways should be properly marked and maintained. Flasks, materials and equipment should be piled properly, orderly and safely. We put forth a lot of effort to encourage proper piling of flasks, patterns, large clamps, flask equipment and miscellaneous small castings, and this is a constant job. Proper clearance of railroad tracks within the plant is a regular problem and the maintenance of proper clearance can be included in good housekeeping and proper chaining operations.

We have a clean-up committee which consists of the Safety Supervisor and members of the Safety & Housekeeping sub-committee of the Labor-Management Committee. This Committee makes periodic inspections covering cleanliness, maintenance of aisleways, piling or any other unsafe practices or conditions.

Refuse cans are placed throughout the plant, well marked and regular disposal of refuse maintained.

Proper lighting is also a necessary requisite. We find that portable stand lamps with metal reflectors (similar to floor lamps but larger) aid considerably when it is necessary for a molder to work underneath a job or when the job obstructs the overhead lighting. We also find that lights mounted on the overhead crane bridge and directed downward will prevent heavy shadows caused by the crane.

Pouring

There is a distinct difference between pouring of small castings and large castings, the difference being hand pouring or shanking and pouring direct from the ladle into the mold. Our pouring is entirely direct from the ladle into the mold and I will therefore deal with that type of operation. The pouring is performed by the ladleman who is required to wear goggles and leather leggings; it is also necessary for him to wear an asbestos coat and hat. Crane signals by the ladleman are given by whistle and hand combination. Unusually large jobs (90 tons and over) require utmost safety precautions. This pouring involves 2 and sometimes 3 cranes and ladles pouring simultaneously. A "drill" is held prior to tapping the heat with the empty ladle, moving same from the Open Hearth or Heat Car to the mold in order to establish proper clearances. An electrician and repairman are stationed on each crane. Recently we had a craneman die of heart failure while operating a crane in one of our cleaning rooms. He was operating only the trolley at that time preparatory to picking up a load. While it is true that this happens very rarely, nevertheless we have issued instructions that the crane repairman shall be on each heat crane, in addition to the regular operator, while pouring heats. This will serve as an extra safeguard during all pouring operations.

Chaining Operations

The chainmen have certain definite responsibilities in moving materials and castings. Safe and orderly piling is the responsibility of the chainmen, which is also shared to some extent by the cranemen; however, continual checking is necessary by the supervisor and Safety Department in order that proper and safe piling be maintained. A survey of our accidents disclosed that the majority of the finger injuries occurred to chainmen having fingers pinched during chaining operations and as a preventative measure special classes were conducted by the Safety Department with all chainmen under our Training Department Program. It is the duty of the chainman to check over his chains each day when making the first lift with each chain and he reports to his supervisor any defects upon discovery. Monthly chain inspections are conducted by the Safety Department together with the supervisor of each department. Any excessive chain damage is reported to the General Superintendent by the Maintenance Department through means of a damaged equipment report. Any excessive chain damage immediately indicates carelessness and improper hooking operations. In operations involving two chainmen the head chainman becomes responsible for the giving of signals. In these cases the craneman accepts orders from the head chainman. Chainmen are instructed to precede all loads through the plant and to caution any employees who might be in danger; this in addition to the warning signal of the crane bell.

Shakeout

Shake-out operations are performed on the shake-out grids wherever possible. Large castings cannot be shaken out in this manner and are therefore moved to a shake-out floor which is somewhat removed from the general working area. Mist spray is used to do the job. Shake-out men and crane men wear respirators during these operations.

Cranemen

Cranemen operate at the direction of the signals from the chainmen on the floor. While the chainman is held responsible for the load, proper chaining to be used and movement of the load, the craneman shares some of the responsibility. If, in the opinion of the craneman, the load is beyond the capacity of the crane or if the load is, in his opinion, hooked improperly or unsafely, he is to call this to the attention of the chainman. If they cannot agree regarding the situation then the craneman is requested not to move the load and the chainman is required to call the foreman on the floor and the foreman then makes the decision regarding the movement of such load.

The chainmen, cranemen and floor supervisors hold periodic conferences regarding the proper movement of loads. This is particularly true in the case of new cranemen to whom the operations are explained in detail by the chainman and floor supervisor.

Crane cables are inspected monthly by the Safety Department at which time the limit switches are also checked. A brief daily inspection of cranes is made by the cranemen at the beginning of each shift and in addition an inspection of cranes is maintained by the Crane Repair Department.

Safety Organization

Safety committeemen are selected by the supervisor and appointed for one year. The names are submitted to the Safety Department and the activities of the Safety Committee are under the guidance of the Safety Supervisors, however, each committeeman is responsible to his own direct supervisor. Safety meetings are held monthly and safety problems and prevention are discussed at these meetings.

New employees are given safety instructions and information pertaining to general plant safety as part of our induction program. All cranemen and chainmen are handed standard crane signals at the time of employment.

Accidents, causes and prevention are discussed at the weekly meeting held in the General Superintendent's office. Accident records, causes and cost are discussed at the monthly Foremen's Club meeting which embraces all plant supervisors.

Plant Publications

Our Continental Plant Magazine, issued every 90 days, devotes liberal space to all phases of foundry safety. Weekly Victory Bulletin devotes space to safety items. Weekly safety letter is issued by the Safety Department which furnishes the department supervisor with a safety talk for his safety meeting each Monday at the beginning of each shift. Safety bulletin boards are maintained by the Safety Department.

It has been said in many industries that accidents increased because of new employees and it may be of interest to give you our latest summary covering the first six months of 1944: It was found that 50% of the accidents involved employees who had been with us 6 to 12 months; 25% involved employees who had been with us 12 to 24 months; indicating that it is not always the newest employee. Analysis also showed that 65% of the accidents occurred on the second and third shifts, on which shifts we employed only 44% of our total employees. Men with the longest service records work the preferable day shift while the newer employees work the other two shifts. Also, we have found that more accidents occur during the last working hour of the shift, and between the third and fourth working hour. This is general information which may or may not tie in with your particular plant.

It has long been the writer's opinion that accident prevention is definitely up to the departmental supervisor. Our company, like many others, has a Personnel and Safety Department. Representatives of the Safety Department make their rounds of the plant on each shift, and whereas I believe the Personnel and Safety Departments make a direct contribution towards accident prevention, the real job is up to the department supervisor because he, first of all, is familiar (or should be) with each individual employee; and furthermore, he has direct authority over the employee, which cannot, of course, be vested to the Personnel Department representatives.

Concerning the matter of treatment as a health measure for foundry workers, our company has recently initiated aluminum inhalation treatment which will be elaborated on by a speaker in another part of this program.