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Volume 12

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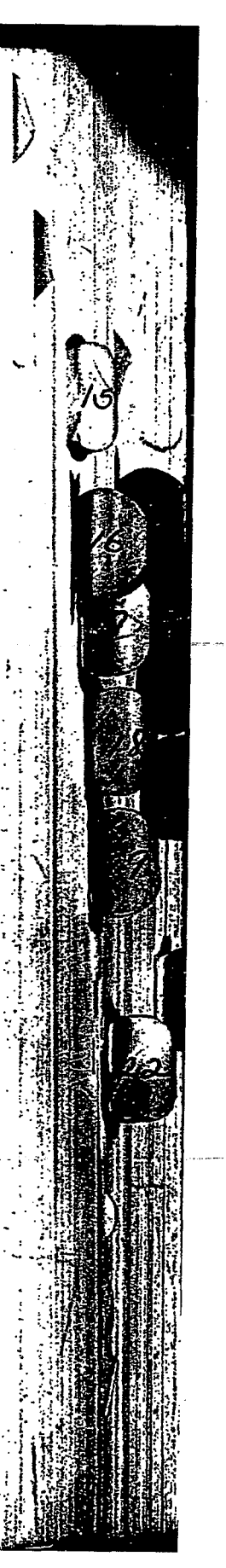

GLASS AND CERAMICS, RUBBER INDUSTRIES

Transactions of the

45th National Safety Congress

(October 21-25, 1957, Chicago, Ill.)

NATIONAL SAFETY COU 3

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LEARNING TO LIVE . . .

Learning to live—safely—was the drawing card which brought more than 13,000 men and women from the United States and 27 other countries to Chicago for the 45th National Safety Congress. These people gathered to exchange the latest ideas in safe attitudes, safe methods and safe equipment. Through speeches, panel discussions and symposiums, they acquired new ideas for helping others—and themselves—to live, work, and play safely.

This was the reason the National Safety Council was organized less than half a century ago, a time when man's thoughts barely kept pace with the industrial revolution. Since then, man has introduced an atomic age which is bringing the continents closer and has made the earth a smaller world. And now man anticipates inter-space travel!

Through science and technology, man is progressing to increasing speeds in travel and production, and increasing dangers—new dangers never before encountered. These, in addition to the everyday hazards of life, occupied the thoughts of the safety people at the Congress.

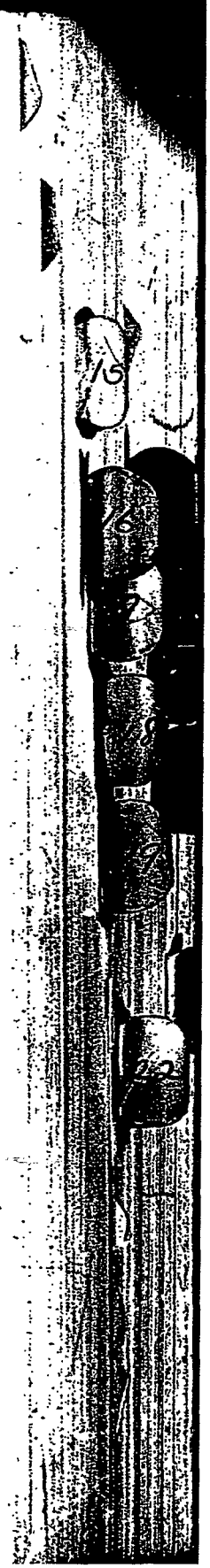
To encourage more widespread knowledge of the various fields of safety, the National Safety Council publishes the Current Safety Topics—30 volumes of condensations of Congress speeches and exchanges of ideas. Each volume is a handy reference to different phases of accident prevention. The complete set of volumes are listed on the back page of each volume.

Since the proceedings have been edited and condensed for reference purposes, the complete original manuscripts with any charts or illustrations used, are available in the National Safety Council files. Views expressed at the Congress or in any volume of Current Safety Topics are those of the Congress participants, and not necessarily those of the National Safety Council.

THE GLASS AND CERAMICS, AND RUBBER SECTIONS

This volume is a record of sessions held at the 1957 National Safety Congress by the Glass and Ceramics section and the Rubber Section. The conduct of these Congress sessions each year is only one of the many cooperative activities which these sections carry on in behalf of their members, and for the benefit of accident prevention work in these industries generally. These sections give guidance in the preparation of a great variety of technical and educational material useful in the day-to-day safety programs of glass and ceramics, and rubber companies.

The activities of these sections are under the direction of their executive committees, the members of which are listed at the close of this volume.



GLASS AND CERAMICS SECTION

INVENTORY OF OCCUPATIONAL ACCIDENT PREVENTION ACTIVITIES

by J. EDWIN CROUSHORE
staff representative, National Safety Council, Chicago, Ill.

One of the functions of the National Safety Council is to serve as a clearing house for the exchange of information on industrial safety practices and techniques among Council members. This Inventory is designed to facilitate this function.

The object of this Inventory is to determine what types of accident prevention techniques are commonly used among the members of the Glass and Ceramics section. This information is provided for Council members to evaluate their own safety activities by comparing them with safety activities of others in their own field.

Experience shows that many managements in the small plant group are interested in learning of safety practices and policies of other plants. The Council feels that the material developed will be useful to small plant management in regard to their activities.

Because of the different types of accident prevention activities applicable in small and large plants, the information gathered is classified as to whether it originates in a small or large plant. Large plants are those with 1,000 or more employees, and small plants are those with less than 1,000 employees. One thousand was chosen as the dividing point because it is approximately the plant size at which there is a tendency towards designating the safety responsibility to a specific individual, and in beginning to think in terms of a formal safety program and organization.

Replies were received from 79 of the 164 questionnaires sent out to the key members and executive committee of the section. By size, the number of plants who returned completed questionnaires is as follows: Under 1,000 employees, 63 were returned; 1,000 or more employees, 15 were returned; one company sent back a questionnaire which represents 36 city area plants.

The Council appreciates cooperation shown by the 79 plants who completed and returned their questionnaires, and thereby made this report possible.

Due to the limited time, only those sections of the Inventory will be covered that are deemed to be of most importance to members of the section. All members will receive the completed report on or about January 1, 1958.

DEGREE OF SUPERVISION

Many phases of industry have been criticized from time to time because of spreading supervision too thin and not maintaining safe work practices. This spread of supervision has been especially prevalent on second and third shifts. However, from all the plants reporting this information for the section, the supervisory load does not appear to be unduly heavy on any other shifts. In this survey the average number employees per supervisor on each shift is as follows: on the first shift for large plants 20 employees, small plants 15 employees, the average number of employees covered on the second and third shifts are identical with those of the first.

It is contended that the supervisor will usually engage in greater safety activity if his employees' accident records are tied into his departmental operation cost. This is being done in four of the large plants, and in six of the small plants reporting. Another industrial section in which this inventory is being conducted reports 52 per cent of the large plants and 33 per cent of the small plants provide this safety incentive to their supervisory person.

In many operations it is important from the standpoint of safety and efficiency that the workers' experience, aptitude, skills, and their mental and physical makeup be matched

to requirements of the job. Failure to give this point the attention it deserves can result in serious work injuries.

Many organizations have developed job specifications which are used as a standard for hiring and placing workers according to the requirements of the job to accomplish this matching of the individual to the job.

JOB DESCRIPTION AND SPECIFICATION

Job descriptions are developed to specify the standard method of the job performance for individual jobs. These are used to guide foremen, supervisors, and workers in carrying out their work safely, and in accordance with approved standard methods.

Many plants recognize the importance of safety as an inherent factor in efficient production, and have their safety department review and check these job specifications and descriptions. This check insures that the job specification specifies the required characteristics of the individuals assigned to the work, and that the job description incorporates safe work methods and necessary safeguards and safety protective equipment for the workers' protection against injury.

CONSULTING SAFETY DEPARTMENTS

Reports indicate almost three-quarters of the large plants and more than half of the small plants consult the safety department when job requirements are developed. This means that safety considerations are incorporated in job specifications in the majority of the plants reporting. Plants that have the safety department check job requirements give the department an opportunity to recommend the use of proper safeguards, clothing, and equipment, as a part of the standard method of performing the job. The safety department can then point out the dangers, toxic, flammable materials, and hazards peculiar to each particular job, and recommend ways to correct these injury exposures in accordance with recognized safety practices.

The majority of reporting plants in the section realize the importance of written specifications and take advantage of their usefulness. But there still remains the good portion of the section who does not use written specifications. In many plants the institution of these practices may be beyond the control of the safety director, but where this is not true it seemed desirable to consider them as a standard procedure.

Once jobs have been studied and job specifications and descriptions written, it is important that they are reviewed from time to time. Further revisions or safeguards may be necessary, or new developments may have to be placed in effect on jobs and operations where they are applicable.

Many organizations hire and place new employees without first consulting the employees' foreman or supervisor. In such organizations the foreman sometimes complains about the quality of his workers. Foremen usually indicate they feel they could make a better selection of personnel if they had an opportunity to pass final judgment before applicants are put to work under their supervision.

Complaining foremen say the workers are not cooperative, that they are difficult to get along with, that they are not reliable, and that even when instructed properly they still fail to carry out their jobs in the manner desired. Although some of these may be an excuse for the supervisor's own failure to give adequate job instruction, or to follow through with adequate supervision, there is often some justification for such complaints.

Many plants try to eliminate this situation by sending job applicants to the foreman for an interview, and leaving final acceptances or rejections in his hands. Where the foreman exercises his prerogative of rejecting the applicant, the latter is often returned to the personnel or employment division for possible placement on another job in some other department.

A large proportion of both large and small plants do have job applicants interviewed by foremen. This is a good showing for the section as a whole, but there are still many plants who do not take advantage of the foreman interview.

APPLICANT'S ATTITUDE

Experience shows that work injuries sometimes result from the worker's not being properly machined to the requirements of the job, in terms of his personal attributes. The employee's attitude is perhaps the most important to the personal attributes he brings to his job. Foremen know that there is a great difference in the way a worker with a constructive attitude accepts

and follows safety precautions and practices, and the way a person with an indifferent attitude accepts the same precautions and follows the same practices.

The foreman's interview gives him an opportunity to evaluate the applicant's experience, skill, physical qualifications, and especially his attitude. If a foreman feels that the man would not make a good and safe worker, the foreman can reject the man before he injures himself, decreases production in the department.

The fact that such a substantial portion of both large and small plants are following this policy indicates that they find it definitely worthwhile. In view of the advantages that can be gained from a safety standpoint, as well as from a standpoint of production, this is a practice which would seem to recommend itself to those plants not presently following it.

When a man is first hired, what he thinks and feels about the work he is doing, his company, his foreman, and the importance of safety in his new job, crystallize into his attitude toward his work. Since these attitudes influence his actions on the job, and are a basic factor in his cooperation and desire to follow the safe work procedures and safety rules, the time to start selling a man on safety is when he is hired.

SAFETY INDOCTRINATION

Because new employees are especially impressionable many companies include a general, but pointed emphasis on safety in their indoctrination of new men. One common means of doing this is to provide the new employee with the safety rule book at the time he is hired, and inform him that compliance with the safety rules, and participation in plant safety programs is an important part of his new job. Usually the new employee is told to read and become familiar with the safety rules, and told that the foreman will review some of the rules with him.

If the worker is to wear goggles, safety shoes, and other protective equipment, he is told about it at the indoctrination, and arrangements are made to draw this equipment. He is told that the supervisor will give him job instructions, will instruct him in the safe practices and safety precautions he is expected to follow on the job. He learns during indoctrination that his supervisor will teach him safety, and will expect him to follow the safety precautoins as a regular part of his day to day work.

The fact that only seven out of the 63 reporting plants do not have a safety indoctrination program indicates that this is one phase of our safety program that the seven plants should, if possible, include in their program. As might be expected, the proportion of plants giving indoctrination singularly is much greater for small plants than for large ones.

HANDLING ORIENTATION

Single employee indoctrination in the small plant is usually handled by the man's foreman or supervisor without any other assistance. A few plants report having the safety division handle single employee indoctrinations, and others have both the foreman and the safety department handle indoctrinations.

Small plants usually give employees their indoctrination program at the time of hiring, or during the first day on the job.

In the large plants single employee indoctrination is handled primarily by the man's foreman or supervisor, and in a few cases by the employment or personnel department. Group indoctrination, in the main, is handled by the safety department, the personnel department, and in a few instances by specially set up safety training programs for new employees.

Where the indoctrination combines single and group instruction, the man's foreman or supervisor usually is assisted by the safety department, or by the training or personnel department. The large plants give indoctrination either before hire, or within 30 days after the man starts on his job. In many cases the initial safety indoctrination is followed up at a later time. Follow-up on this phase is from one week to six months after hire.

An example of an indoctrination program is a large plant that gives new employees indoctrination singularly and in groups. Before starting work, a group of new employees meets with a member of the safety division, or a district safety coordinator, for basic instructions on safety and other procedures. When the new employee reports to work his foreman gives him single indoctrination showing him the particular hazards,

and ways of avoiding these hazards. At the group meeting a copy of the safety practices handbook is presented to each employee. The foreman then explains various rules to the employee who can question his foreman as they go along.

Some examples of plant safety rule books which are used in indoctrination in some plants have been provided by a number of large and small plant members. In those cases the booklets are devoted exclusively to safety rules and precautions, but sometimes the book incorporates safety and organizational material, personnel policies, and a brief company history. Usually such booklets are issued permanently to new employees who are expected to become fairly familiar with the safety rules, and to give the personnel department a written statement that they have done so. During the indoctrination attention is called to the booklet's importance, and its principal provisions are reviewed orally with the new employee.

Failure to carry out job instruction and good supervisory follow-up has been a causative factor in innumerable work injuries. Workers who are not well trained are apt to make mistakes or fail to follow correct safe practices, with the result that accidents occur. Good job safety instruction will point out to the worker what his specific job hazards are, and show him safe work practices that will help him avoid these hazards.

JOB INSTRUCTION, TRAINING

Job safety instruction is usually most effective when given to the employee on the job by his foreman, or by the supervisor who gives him his work assignments. The supervisor can evaluate the employee's attitude toward his job, his aptitude to absorb instruction correctly, and the extent to which he is familiar with the correct method of job performance when the instruction is completed. Since the supervisor is the one who gives him his work assignments, the supervisor's knowledge of the employee's job competence and know-how assists him in exercising good judgment in giving work assignments to the new employee.

A good method of job safety instruction is for the foreman to give individual instruction to new employees, and then have the personnel or safety department follow-up to check on the extent to which the new employee has absorbed the safety aspects of his instructions. If the employee is not adequately familiar with and currently following safe work methods and precautions, he will be given further instructions and follow-up by his supervisor. Such follow-up will disclose any deficiencies in the instruction given, or in the employee's absorbtion of the instruction.

Many plants in industry give workers instruction in production procedures, but no instructions on the hazards inherent in their operations, and the safe work methods and safety precautions for avoiding them. Lacking this specific knowledge, workers often commit acts which result in severe accidents.

USE CHECK LISTS

Poor job instruction, in many cases, has been traced directly to the instructor's failing to organize all the important points of the job clearly in his mind before giving the instruction. Consequently, the instructor overlooks certain safety features or other important points about the job. When this happens the employee being instructed fails to learn all the safe work methods and other safety precautions needed for his job. Training specialists recognize the importance of a checklist of safety items to be covered, or the use of a job instruction breakdown which incorporates all the safety features and precautions to be observed in connection with the job. In the latter case the safety instruction is an integral part of the regular job instruction.

Before job breakdown for instruction purposes is prepared, the job must first be reviewed and instructions listed according to safe procedure and standard work methods. The safe work method and safety precautions must be determined and these points entered into the breakdown. The result is a written breakdown which incorporates all the safe work methods and precautions which the worker should understand in order to avoid injury in performance of his job.

The breakdown provides the supervisor with a standard method of safe job performance. When this breakdown is followed each time a man is instructed in performance of his job, it insures that all men are uniformly instructed in the one best safe method of job performance. It also insures that the supervisor does not overlook any of the safety features of the job at the time of instruction.

The Inventory shows that the precautions of preparing job breakdown or lists the safety items to be covered during job instruction are ignored by a majority of the plants in the section. It seems apparent that this point deserves consideration from a number of plants in this section to make their job safety instruction more effective.

The usual practice in general industry is for the supervisor who actually gives job safety instruction to make his own breakdown on the jobs involved, and to use these as a reminder of the various points to be covered when he gives instruction. To be sure that the breakdowns, or list of safety items which should be covered are complete and effective, it is a good practice to review them with a representative of the safety department. Although many supervisors are qualified to do a good job in this respect, with the assistance of the safety department they can do an even better job.

The fact that slightly less than 50 per cent of all plants have the safety department check instruction breakdowns and safety checklists indicates that this checking is an important part of preparing job breakdowns. Any plants who adopt this policy in the future should adopt both parts of the procedure for maximum effectiveness.

TRAINING SUPERVISORS

The method of presentation is as important in job safety instruction as are job breakdowns or checklists. An effective instruction technique, such as the "J.I.T." for method of presentation should be used when giving instructions. The instructors should be taught a special technique that is easily understood and effective for the type of instruction they are to give.

One small plant indicates the use of outside help. It states that it sends its supervisors to a university extension course training. The large plants rely mainly on in-plant training, conducted by a training department, personnel department, or the safety department.

More important than who conducts the training is that the person doing it is well qualified to give the plant instructors a practical, useable knowledge of an effective instruction technique that can be applied to job instruction training.

Fifteen small plants and four large plants imply, or state definitely that instruction in job hazards and safe work practices is not adequately emphasized. In practically all of these plants all supervisors are not given special training in job safety instruction methods, nor are job breakdowns or checklists of safety items to be covered prepared.

Since good job safety instruction is an important factor in preventing work injuries it would appear that this is an area in which these 19 plants can make an important improvement, and add emphasis to their accident prevention efforts.

FIRE EQUIPMENT AND TRAINING

The fact that 78 per cent of the small and 95 per cent of the large plants reporting recognize the importance of having a well-organized fire prevention program, is very encouraging. Fire in the plant concerns everyone since it affects not only production but job security and steady income.

Among plants reporting, the method of training was almost identical, except that scheduled training periods vary from regularly scheduled meetings to periodic or as needed. Training in the larger plants is assigned almost exclusively to either the safety director or plant fire chief, augmented with assistance from the city fire chief or college extension service instructors. Small plants rely almost exclusively upon outside assistance.

The personnel instructed varied with the size of the plant, some plants using one department exclusively, others using personnel from all departments, while a few plants used only foremen and supervisors.

No attempt has been made to consider large or small plants individually in determining the use of employee publications for publicizing accident prevention material.

Sixty-six per cent or two-thirds of the plants reporting have some type of employee publication, however, only 48 per cent of the plants having publications devote space for safety items. This would indicate that many plants are not taking advantage of an excellent medium to publicize its activities, reaching not only the worker but his family as well.

Companies devoting space to safety vary space allocations to suit their needs on the

subject covered. Space varies from one inch to 20 inches per month.

In this section of the report we encountered a wide variation of opinions on the most effective types of employee material.

The largest percentage favored: written instructions, blackboard talks, films, posters and booklets from outside sources and their own publications. Publications for family distribution were also reported as being advantageous. However, in this category only a small percentage is using family contacts to improve accident prevention activities.

Reports all indicated that few plants are taking advantage of off-the-job safety material available through the National Safety Council.

Since companies not having safety awards or award limits are in a vast majority, large and small plants have been considered together in interpreting this section of the report.

Occasionally some type of personal award is given employees working on safety committees as a matter of recognition for a good report.

SAFETY AWARDS—LIMITS

Many companies feel that good performance in safety cannot be bought. However, the vast majority did agree that if awards were made they should be small, inexpensive personal items so the company could cover many more employees.

Only four per cent of the large and 16 per cent of the small plants include families of their employees in their safety promotion campaigns.

Companies using this family participation report good results and feel that the additional effort required for this type of promotional activity is worthwhile.

Mediums used are: house organs, special mailings of material and personal letters and payroll stuffers with safety slogans. A few companies make periodic calls to families, requesting the safety slogan, if known, and giving a small reward. Of the companies not having family participation, less than two per cent anticipate setting up any type of incentive award plan in the future.

Since only 12 per cent of the large plants and eight per cent of the small plants include any type of supervisory bonus or awards this indicates that such a practice is not general within the industry. Where it is a practice, bonuses are worked into and are a part of the regular department production bonus plan.

SUGGESTION PLANS

In this category 80 per cent of the large plants and 62 per cent of the small plants reported that they had a suggestion system in effect or just starting. This would indicate that a vast majority of companies favor this type of employee relations. The number of suggestions received during the period covered by this report varied from zero to 3,000 with 50 per cent being adopted.

Methods of compensation for suggestions adopted varied extensively, the most predominant being cash awards. Such awards in some instances were made arbitrarily, while others pay a set figure upon committee approval and then pay an additional award or bonus after the suggestion has been used for a set period of time. This additional bonus is based upon the elimination of the hazard and reduced production costs. In all instances a management committee passses judgment on all suggestions. In some cases the suggestor is requested to present additional facts to clarify his suggestion.

Compensation for suggestions ranged from merchandise to $100, with the majority of companies basing awards on the percentage of savings over a period of time, usually a the necessary training to alert employees period of one year.▲

GLASS FURNACE REPAIRS

by CLINTON BALLINGER
safety director, Owens-Illinois Glass co., Gas City, Ind.

A glass melting furnace is made of refractory and steel in different shapes. The area where the melting process takes place is shaped like a huge cave. The walls and floor are made of blocks of various refractory material, each block being 18 inches to 60 inches long and 12 inches thick. The roof is also brick.

On each side of the melting area and connected to it are the checkers which serve as the passage way for the various types of fuel to flow to the tank to melt the batch to make glass. The inside of the checkers are of brick laid to form a honey comb pattern. The checkers may be 30 feet high, 12 feet wide, and 25 feet long.

The plans to repair a tank evolve when the tank is built. The first step to repair a tank is to drain the tank of several hundred tons of molten glass. A special block is built in the tank for this purpose. A hole is knocked in this block and the molten glass runs into a stream of cold water which carries it several feet outside the building to a prepared bin for storage.

While the draining of the tank, the heat on the glass is about 2700° which insures a free flow of glass. About 12 hours are needed to drain a tank of 250 ton capacity. When empty all fires are turned off; the following day dismounting starts. But even then the tank proper is still very hot.

When a tank is out of operation for repairs, several men are out of their regular jobs. In our plant this means 20 to 30 men have to be placed on other jobs or laid off. Of course, these men have the least seniority and therefore are considered green help when put on a tank repair.

REASSIGNING CREWS

About one week before taking the tank out of operation, the plant engineer asks for 30 or 36 men to work with the regular maintenance crew. About three days before beginning work, we call a meeting to assign them to a shift and introduce their crew leader. Every type of safety equipment is shown, and when and where to wear it. They are also told if they can't wear this safety equipment someone will take their place.

One man of the group is designated as the safety and good housekeeping coordinator and reports directly to the plant engineer. This man has played a very important roll in our safety record for the past several years by making it an important job to himself. He has the responsibility of checking out all safety equipment and also seeing that it is used properly.

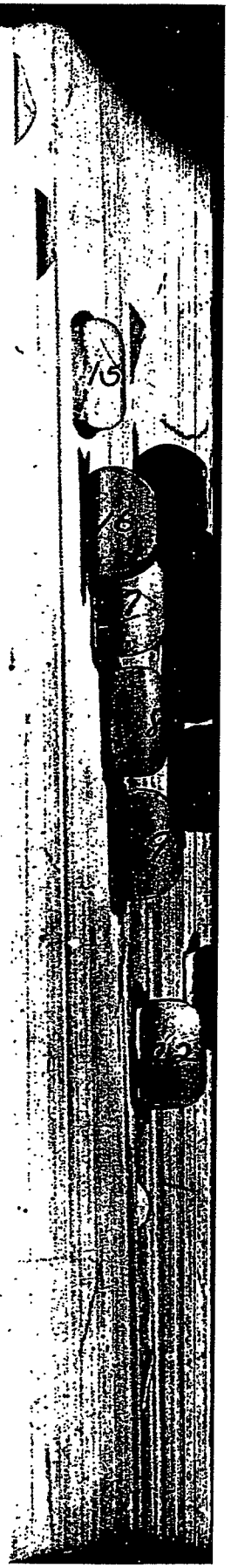
When the time comes for dismantling the furnace, the checkers have been opened up. They have had time to cool off but are still pretty warm. The first step is to throw out bricks by passing from one man to another. The first few hours result in a lot of horse play as the bricks are hot and a man only holds a brick long enough to toss it to the next man. Since this can result in cracked shins and broken toes, it is one feature that must be watched—for the first day—until the checkers are cleared out or the bricks have cooled down.

EARLY DISMANTLING JOBS

After about three days of dismantling in which the work is hot, dirty and dangerous, the brick masons are called in and the building up process begins. There is still much dismantling done, but enough is completed for construction to start.

While this work is going on (on the tank proper), there are several other crews working, such as the electricians, plumbers, steel workers, tinners and machine repair men. Although these craftsmen's work may be in different spots around the tank, they must know of the other work going on above them, below them and on either side of them. We are not too alarmed that a man throwing bricks will hurt himself but that someone else will catch the full force of a hastily tossed brick.

One of the big items on any repair is this thing called housekeeping. In every plant today it is stressed in many different ways to the employees. Many supervisors feel a



good housekeeping program is lots of janitors and lots of brooms. But it's not. It is pride in the worker who wants to work in a clean place, and will do his part to keep his work area clean. This is a job for the supervisor and only the supervisor.

GOOD HOUSEKEEPING ESSENTIAL

Many accidents are caused by poor housekeeping and little or nothing is done to correct the condition. When 50 to 75 men work in an area not much larger than a basketball floor, with many types of material and equipment, good housekeeping is a must. If you have a good housekeeping program you will likewise have a good safety program. Our last lost time accident on a tank repair was caused by poor housekeeping—a small piece of brick was lying on the floor (probably had been there for two or three days), a brickmason stepped on it and broke his ankle.

To make safety more real to the average man, several methods or approaches can be used. Posters are the largest medium to preach safety. Supplementing the posters we have been using the give-away gimmick. After one full week of work on a tank repair, the names of all men working on the tank are put in a box. At the 3:00 p.m. coffee break, while the men are congregated in one area, one name is drawn out and this individual wins a small prize such as a jacket, pair of safety shoes or one of several items costing from $3 to $10 dollars. This gimmick has done more to promote safety on tank repairs in our plant than any other. Since the use of the give-away idea, we have not had a single serious accident.

Proper scaffolds are always a must and should be inspected before being used and very often after that. The use of high lift trucks to transport and elevate tank blocks certainly cuts the danger of smashed toes, fingers and back injuries. The payloader is a real asset in loading trucks of bricks torn out of the furnace.

Every safety device and gimmick available should be used on one of the toughest jobs in the glass industry.▲

HOW TO CONTROL OFF-THE-JOB ACCIDENTS IN THE GLASS AND CERAMICS INDUSTRIES (A Symposium)

OFF-THE-JOB ACCIDENT CONTROL IN A SINGLE LOCATION COMPANY

by JOHN NANFELDT

safety director, Harding Glass co., Fort Smith, Ark.

With the increased cost of group insurance plans and the increased specialization among employees, this is one field of accident prevention that is important to all industries regardless of what they manufacture, whether they are large or small, located in one city or spread over the entire nation.

I do not propose that we, at Harding Glass company, have the complete answer for controlling off-the-job accidents, but I do feel that our record indicates that we have made some progress in controlling this type accident during the past several years.

Before actually considering the features of our program, it might be well for us to describe our company. As you are probably aware, we manufacture flat drawn sheet glass. We are a member of the Fourco Glass company and are located in Fort Smith, Ark. a city of approximately 60,000.

During full production, we employ between 600 and 700 people. Our employees and their families number approximately 3,000 or close to five per cent of the city's population; therefore, it is easy to see the importance of an off-the-job safety program to our company.

Strictly speaking, the off-the-job accident control program at Harding Glass company may be divided into three sub-divisions. First are the activities of our Safety Council, composed of management, all supervisory personnel and foremen, and elected employee representatives from each department. This group meets once each month to discuss safety problems that affect the plant in its entirety.

Guest speakers are invited to discuss safety subjects of various types. The overall program for each month in a given year is set up by a program committee. It has been a policy of this program committee to include three or four monthly meetings of this group dealing with off-the-job accident control. For example, we have had meetings on such subjects as highway safety, at which time, a member of the Arkansas State Highway Patrol was our guest speaker.

COMPANY SAFETY COUNCIL

The members of the Safety Council are called upon in their regular monthly departmental meetings to report on the subjects discussed at the previous Safety Council meeting. In this way, this information is passed along to all the employees in the factory.

The second major division of our safety program that deals with off-the-job accident control is our departmental safety meetings. In my capacity as safety director, I meet once a month with every department in our plant. In these meetings, subjects pertaining to the safety of that particular department are discussed, along with an overall subject discussed in the meetings with all departments.

For the past few years, it has been a policy to devote three or four of these monthly meetings each year to subjects dealing with off-the-job safety. For example, subjects such as "Water and Boating Safety," "Home Fire Prevention" and others of this type have been discussed. Through these meetings and the discussion of subjects dealing with home safety, we feel that we can accomplish two things: (1) Impress upon the employees the company's genuine concern for their safety away from the job as well as on the job. (2) Educate all employees to recognize and correct hazards around their own home.

FAMILY NIGHT PROGRAM

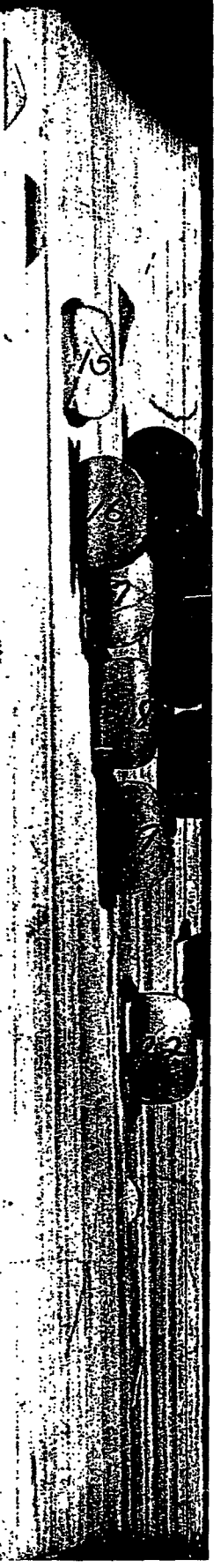
The last feature of our program is what we call our Family Night Program. This is a program sponsored by the plant Safety Council for all of our employees, their families and guests. This is an idea which started seven or eight years ago to promote interest in the plant Safety Council. During the ensuing years, it has come to be one of the most looked forward to events in our safety program. This Family Night Program is primarily a chance for all employees and their families to get together for an evening of entertainment and safety education.

We have found that early in the spring, February or March, is the best time for a program of this type. In our part of the country, most of the bad weather is over and it is too early for any vacations to have started. We have used the auditorium of a grade school located near our plant to hold this event.

Since most of the employees will bring their children, we start our program at 6:30 p.m. and try to limit the entire program to about an hour and a half. We have also found it better to complete the safety educational portion of the program at the first of the program and not make this part any longer than absolutely necessary.

By doing this, we are able to get the safety message across and get into entertainment features of the program before the children get too noisy or restless. Another way we maintain the interest of the children is by using games or contests involving the children. For example, one year, we had the children put on a prescribed amount of safety equipment and blow up a balloon. The first one finished in each age group won a prize.

The entertainment we have used in this program has been a variety of local talent, such as singing groups, dancing and instrumental groups. To stimulate interest and promote attendance, we award door prizes. We feel that our Family Night Program produces desirable results. It provides a



social contact for all employees and their families while pointing out to our employees' families the company's genuine desire to provide a safe place for the members of their families to work.

Through the brief educational portion of this program, we are able to get ideas across pertaining to the safety, not only of our employees while on the job, but also all the employees and members of their families while they are off the job.

These, then, are the three important features of our off-the-job accident program. The acid test of any program is "does it work and what results has it produced?"

We feel that our program is beneficial not only in a reducing the number of accidental injuries, but also in producing a savings in the company's group insurance program costs. To illustrate this, I have compiled the sickness and accident payments for accidental off-the-job injuries for the years of 1955, 1956 and through September, 1957.

COSTS OF ACCIDENTS

In 1955, employees of Harding Glass company suffered 13 injuries which caused loss of time from work and one accidental death. These injuries include lacerations, back injuries and fractures. The accidental death was caused by drowning. The lost time caused by these injuries amounted to 78 weeks and two days in the amount of $2,348.00 in S&A benefits.

In 1956, 11 employees lost time from their jobs. The total lost time was 20 weeks and three days for which $612.00 was paid in S&A benefits. For the first nine months of 1957, three employees have lost a total of 22 weeks and three days from their jobs and have been paid $672.00 in sickness and accident benefits.

The life insurance premium rate for our employees since 1948 has shown a decrease of .03c per thousand dollars while the average employee age has gone up. This does not represent a great drop, however, considering the relatively large number of employees involved and the period of time, this decrease represents a considerable saving to the company.

Similarly, the sickness and accident premium rate has remained constant since 1952, the amount of benefits has increased at no increase in premium rates. No summary of hospitalization costs have been used since there have been a number of benefit increases and changes of insurance carriers so that no accurate picture could be drawn.

In view of the results that have been reflected in the reduction of accidental off-the-job injuries and the reduction in group insurance costs, we feel that our program has been successful.

ALCOA'S APPROACH

To the Off-The-Job Safety Problem

by W. R. GILLILAND

assistant safety director, Aluminum Co. of America, Pittsburgh, Pa.

Alcoa has been concerned over this problem of off-the-job injuries for several years. However, we lacked concrete facts concerning the true dimensions of the problem, and didn't know the best way to obtain the necessary information.

When the National Safety Council announced their standard reporting form for off-the-job injuries in the fall of 1955, we asked our plants to use this form not only for reporting to the National Safety Council but also to our home office. We do not use the formula for Frequency and Severity rates but complete all other items.

Our procedure is generally as follows: All employees are covered by non-occupa-

tional disability benefits, medical, and surgical insurance program. The Insurance Department at each location, therefore, serves as an ideal accumulation point for all insurance claims of off-the-job injuries. Claims for employees' dependents can be accumulated in a similar fashion by each plant and reported to us on the National Safety Council form.

This arrangement has simplified the problem considerably. We probably miss some minor cases which result only in one or two days' absence from work or other minor incidents for which claims may not be filed. However, such cases constitute only a very small percentage of the total. Considering the foreman's or supervisor's time required to investigate every single absence for complete data, we believe our procedure is quite adequate for all practical purposes.

The data obtained from this reporting procedure during 1956 were:

> 1219 off-the-job injuries. Of these, 18 were fatalities—17 in traffic accidents and one at home. This amounted to 4.18 injuries off-the-job for every one occurring on the job and 9 off-the-job fatalities for every industrial fatality.
>
> There were 23,497 days lost as a result of these injuries. This does not include any standard time charges for permanent partial disabilities and fatalities. The time lost is 3,335 man-weeks or 64 man-years of productive working time lost in a company of 50 thousand employees.

In addition to the loss of manpower and skills, the weekly disability benefits paid to employees for lost time due to off-the-job injuries in 1956 was 133,400 dollars plus life insurance benefits of 90,000 dollars for families of 18 deceased employees. This amounts to approximately $4.40 per employee a year. Although the insurance carrier pays these costs, our company pays the insurance premiums and we benefit by any reductions in payments.

This represents a substantial incentive for the company without including hospital and surgical expenses or any indirect costs. Needless to say, the cost to employees in lost wages and suffering is a considerable item, and should serve as an excellent point for rallying employee interest and support for off-the-job safety programming.

As I mentioned before, we do not have a complete program. As in industrial safety, there are a variety of different approaches with no single answer as the exclusive remedy. Education of employees and their families will undoubtedly be the major approach since supervision and other controls in industrial safety are absent.

RALLY LOCAL SUPPORT

Our principal approach to date is through locally conceived and sponsored programs hitting one or more phases of the problem at any given time. One example is a traffic safety program sponsored by one of our plants early this year.

This plant is located on a stretch of highway with the worst accident rate in the state. A 30-day campaign was launched with the cooperation and assistance of all industries located on the highway. Comprehensive publicity through plant and community newspapers and radio stations was arranged. "Back the Attack" bumper stickers and other reminders were distributed to all employees. Poster programs were keyed to this theme. Supervisory, safety committee, and employee meetings were held to discuss the problem and show traffic safety films. State police troopers participated in the meetings and campaign to warn motorists of highway hazards. Letters were sent to employees' homes. This same topic is being plugged this year to keep the topic fresh in the minds of employees.

While it is still too early to prove that this effort reduced injuries, we believe it has had quite an effect.

Another example of this local approach is in a small community where Alcoa is the principal employer. Here we use the services of all community organizations while the company acts as sponsor furnishing materials, lending guidance and support. Gaining participation by as many people as possible is a major objective of a successful off-the-job safety program the same as it is for an in-plant program.

In regard to the program at the home office, we make available all types of materials and services to the various plants. All plants receive the off-the-job materials published by the National Safety Council. The *Alcoa News*, our company house organ sent

to all employees, features articles and items pertaining to the subject. Reading rack booklets on off-the-job safety constitute a large percentage of the materials approved by our home office.

In addition, we are considering certain company-wide programs such as the Safe Drivers League as a continuing effort to superimpose the current one-shot type of campaign devoted to a specific hazard.

We feel that by constantly hammering away through the proven techniques of industrial safety programs, we can reduce the terrible toll of suffering and expense to our people resulting from accidents at home and on the highways. ▼

ARE OFF-THE-JOB SAFETY PROGRAMS NEEDED IN INDUSTRY TODAY?

by R. P. HAMILTON

superintendent of safety, St. Louis-San Francisco Railway co., St. Louis, Mo.

During the past few years we have been brought face-to-face with startling facts. There has been an increase in school enrollment, in political activity, in the merger of great industries, in wages, in speed, and, according to statistics from the National Safety Council an increase in the number of persons killed and injured. There was an increase of two per cent in the number of persons killed in 1956, or a total of 95,000 killed and 9,500,000 injured.

Considering that approximately 81,000 of those 95,000 fatalities during 1956 occurred in off-the-job accidents, we realize that we should have off-the-job safety programs.

Although the cost of accidents, injuries and deaths is secondary, it amounted to $11,200,000,000 in 1956. This expense for loss of life, injuries, and destruction of property, would have clothed every man, woman, and child in the nation in 1956. It would have built 1,000,000 single-family homes, or 300,000 school rooms which are badly needed. It would have provided all three shots of Salk vaccine for every person in the world. The cost exceeded the net income of the nation's 135 largest railroads, utilities, and corporations. How nice it would have been to be able to spend that $11,200,000,000 for construction rather than destruction.

We feel that safety should be a family affair because it reaches through each man's job to his home, his family, his clubs, his schools, and his community.

The basic principles of off-the-job safety programs of railroads can be used in any organization—*make safety a family affair.*

During the latter part of 1947 I felt that we were not making sufficient progress in safety on our railroad and we should try something new. It was decided to hold some family safety meetings. On a cold, wet night in December, 1947, we held our first family group safety meeting with an attendance of 84—not too many, but at least a start. During 1956 we had two such meetings with an attendance of over 1,100 at each meeting. Last year 53 family group safety meetings with more than 29,000 in attendance were held over.

During April of this year there were over 5,800 at our Springfield, Mo., meeting. We had to turn away more than 500 people unable to get inside the building because the doors were closed by the city firemen for safety's sake. This clearly demonstrates that there is an interest in safety. We have always felt that if you can show the employee you are interested in the safety of his family as well as himself, he will be more responsive to the on-the-job safety program. If an employee is safety-minded at home and on the highway, he will also be safety-minded on the job.

The highlights of our safety program as summarized by "Railway Age" are:

- "Its ubiquitous energy (because it comes largely from within rather than from the top).

- "Its active—rather than passive—character for most employees (i.e., it is widely participated in, not just looked at or listened to).
- "Its sincerity, as evidenced by its volume of non-railroad public safety work.
- "Its corner-stoning the basic Frisco policy of building management potential from within the organization through widespread employee activities.
- "Its hand-in-glove fitting into Mr. Hungerford's philosophy of building up the individual and respect for his dignity.
- "Its knitting together the Frisco 'family' of 17,000 scattered employees by providing fellowship and a common goal reached through common experiences.
- "Its immeasurable public relations benefits derived through selfless efforts in community and home safety.
- "Its appeal to even non-railroad families through the continuing work with school children and family groups.
- "Its ability to save lives and suffering while at the same time boosting morale and pride in the company.
- "That the program has won over the Frisco rank and file is no better illustrated than in the remarks of a recently retired locomotive engineer. Spotting Mr. Hamilton one recent afternoon, he said: 'I thought this safety thing would die out when you first started it. It always had before. But I wish now that the company had started your program 10 years sooner.'"

We are confident that our off-the-job safety program helped save many lives and much needless suffering, and we feel the same way about the various programs carried on by industry today. The managements of a large number of railroads and industries of America feel we do need off-the-job safety programs, and we are confident that each year will see an increase in those participating in this worthwhile cause.

RUBBER SECTION

REPORT OF THE STATISTICS COMMITTEE

by RAY HART
safety director, The Dayton Rubber co., Dayton, Ohio

The records say that three people will die and 270 will be injured, while I am talking for 15 minutes. Approximately 95,000 are killed each year, accidentally, one way or another. About 40,000 die in traffic, 28,000 in their homes, and 14,500 on their jobs.

When we say 14,500 people died on their jobs and 28,000 in their homes that sounds good, and we hear it said that industry has a good safety record. Personally, I can't agree with this, because the record is not good as long as 14,500 people are losing their lives annually. It only looks good when we compare it with other causes that have a worse record than we do.

We are specifically concerned with the rubber industry. You want to know where we are in the standings and how we compare.

(1) First of all let's look at the frequency and severity record for the rubber industry from January 1, 1950, to the end of 1956, as reported to the National Safety Council.

FREQUENCY AND SEVERITY FOR RUBBER INDUSTRY—NATIONAL SAFETY COUNCIL

Year	Units	Total Injuries	Fatal Injuries	Permanent Partial	Temporary Total	Hours Worked	Frequency	Severity
1950	66	1198	8	86	1104	390,382,400	3.07	700
1951	107	2105	4	129	1972	355,637,500	5.91	360
1952	121	1996	6	143	1847	633,968,700	3.15	420
1953	128	1801	13	147	1641	390,382,400	4.61	490
1954	133	1411	8	105	1298	355,637,500	3.97	390
1955	136	2228	14	198	2016	633,968,700	3.51	390
1956	116	879	2	90	787	267,657,000	3.28	328

(2) Now, let's look at the frequency and severity for all industry, as reported to the U. S. Department of Labor for the same period.

FREQUENCY AND SEVERITY FOR ALL INDUSTRY—U.S. DEPARTMENT OF LABOR

Year	Units	Total Disabling Injuries	Fatal Injuries	Permanent Partial	Temporary Total	Hours Worked	Days Charged	Frequency	Severity
1950	6395	113,273	1,005	6,998	105,270	12,176,202,000	11,503,928	9.30	940
1951	7134	127,559	1,210	7,417	118,932	14,086,031,500	13,599,215	9.06	970
1952	7920	126,361	1,178	7,915	117,288	15,044,279,400	13,311,326	8.40	880
1953	8139	117,448	1,148	7,952	108,348	15,784,164,900	13,064,330	7.44	830
1954	8456	107,051	1,170	6,846	99,035	14,820,420,100	11,826,340	7.22	800
1955	9315	111,429	1,302	7,404	102,723	16,012,022,300	13,046,237	6.96	815
1956	9605	98,380	1,082	6,179	91,119	15,430,729,000	11,307,232	6.38	733

(3) Now, we have the frequency and severity for all industry, as reported to the National Safety Council for 1956.

The 1956 Injury Rates as reported to National Safety Council

FREQUENCY		SEVERITY RATE	
Communication	.89	Communication	58
Aircraft Mfg.	1.92	Tobacco	82
Electrical Equip.	2.01	Leather	121
Automobile	2.56	Electrical Equip.	156
Cement	3.08	Aircraft Mfg.	227
Tobacco	3.27	Automobile	280
Rubber	3.28	Rubber	328
Steel	3.83	Sheet Metal	554
Ship Building	4.56	Railroad Equip.	596
Railroad Equip.	5.89	Ship Building	667
All Industry	6.38	All Industry	733
Pulp & Paper	7.24	Iron & Steel	770
Leather	7.56	Wood Prod.	818
Meat Packing	8.00	Steel	850
Iron & Steel Prod	8.72	Foundry	876
Wood Prod.	9.63	Cement	1588
Foundry	10.32	Construction	2375
Construction	19.10	Lumber	2436
Lumber	22.32	Quarry	3136
Coal Mining	23.07		

(4) Last of all, let's see how the small plants compare with the large plants, as far as safety is concerned.

Injury Frequency Rates by Size of Reporting Units for the Rubber Industry—U.S. Department of Labor—1955

Size	Tires & Tubes	Rubber Footwear	Misc. Rubber Products
Less Than 20 Employees	—	—	10.12
20 to 49 Employees	—	—	13.0
100 to 249 Employees	—	—	21.0
250 to 499 Employees	14.4	—	14.3
500 to 999 Employees	3.7	12.5	10.7
1000 to 2499 Employees	4.2	6.8	5.1
2500 and over	2.6	0.8	5.0

Injury Frequency for This Year

January Thru August	Frequency
Under 300 Employees	6.02
300 to 500 Employees	6.46
500 to 1000 Employees	2.40
1000 to 2000 Employees	2.37
Over 2500 Employees	2.10
All Divisions 7-31-57	2.68

We can break down the injuries in the rubber industry and count the toes, fingers and hands that were affected, also the ones that were caused by machines, but what will that tell us? We still must deal with them individually—first find the cause and then the cure.

It has been said that more than 95 per cent of our injuries are caused by unguarded minds, and less than five per cent due to unguarded machines. I wish I could tell you exactly how to establish a better safety record, but I am afraid I don't have a sure cure. I am convinced that it is a job for supervision and no one else can do it. I can make it sound rather simple, because our work boils down to this—how do you make a supervisor want a good safety record? The desire must be there first.

It is not too difficult to provide ideas that will get good results, once we get them in the right frame of mind. Safety work reminds me so much of church work. We are all striving to do the same thing, but we use different methods to get the job done.

Perhaps this is a good approach to the problem. We try one idea and it appeals to some; another idea appeals to others, and so we continue on, and some day perhaps we will get everyone safety minded, if we can come up with enough new ideas.▲

ACCIDENT—CAUSE, INVESTIGATION AND PREVENTION

(Round Table Discussion)

ED TURNER, Conference Leader

I should like to preface my brief introductory remarks by establishing two simple propositions:

1. Only by a realistic analysis of the accidents occurring in our plants will we ever be in position to assess what we have accomplished in accident prevention, and what we hope to accomplish.

2. The objective of accident analysis is to establish the real causative factor, to carry out a thorough fact finding investigation of all history surrounding the case to set up workable preventive measures.

The factors of cause and investigation are relative. So as to clear our thinking, we shall look at it this way.

ESTABLISHING CAUSE

CAUSE is the actual agent, causing the injury. In essence, this may be the briefest part of our discussion; we really seek to establish who and what with the object of establishing fact and dissipating baseless rumor and possible panic. In establishing accident cause, in its simplest terms, we merely want to know whether the agent is human or mechanical.

Cause should never be confused with blame. It is a human failing it seems, that as soon as a tragedy occurs, a sacrificial goat is looked for on whom to pin the blame.

This resolves nothing, and merely turns the factor of shock and grief into mistrust or bitter recrimination.

Until such time as all the facts are established, management must assume full responsibility to give a full and proper account of what has occurred, and endeavor to offer a measure of calm assurance and reality at a time tempers are delicately triggered.

In this section we should consider (1) who should investigate and (2) what to investigate.

A representative of management is the best person to carry out a thorough investigation of all accidents or accident producing conditions.

The main purpose of an investigation is to find the fundamental error which caused the accident and correct it whether the error falls into the human or the engineering category.

The investigation should be made as soon as possible after an accident—before the conditions or machine can be changed.

PREVENTION

So long as management assumes the responsibility to manage the plant, then it must be the prerogative of management to act as the sole enforcing agency to—

(a) Correct defective working conditions.

(b) Put a stop to improper work practices.

I was much impressed last year when listening to a labor discussion when several workmen were insistent that their bargaining representatives incorporate into their agreements specific safety regulations, only to be told in no uncertain terms, something to this effect:

"Just keep this one thing in mind; that while we mutually subscribe to the need of safety measures in our plants, our local agreements will only deal with the subject in a very general manner.

"The sole responsibility for the safe welfare of the man in the plant is management's. Labor does not share in this responsibility as a management function; if and when we do that, then we must also expect to share the blame for accidents."

I do feel, however, that the management member should promptly inform the union safety representative of the actual history of the accident and the measures recommended to prevent its recurrence, in order that the union may have confidence in the impartiality and thoroughness of management's investigation.

Let me illustrate by two actual case histories:

ACCIDENT NO. 1

Six weeks ago a telephoned report came to my desk of a man having his arm caught in the spreader rolls of a machine.

Now long since, I have learned this cardinal rule—In any serious accident, get on the job immediately to establish as soon as possible (and certainly before rumor gets busy) the accident cause and extent of the injury.

In reaching over the top of a chain drive, this operator's sweater sleeve was caught, and it pulled his arm up against, but not into, a small idler sprocket. From the workman, who was well enough able to talk, we ascertained that he had followed a standard procedure, and was using a knife to free some loose threads adhering to a smooth rool. In picking off the threads he had to reach in further than normally, and came into contact with the chain.

This operator suffered severe lacerations and contusions to the lower arm. There were no broken bones and he was off the job for six to eight weeks.

Thus we had established the cause and the *whom* and *what* of the accident.

The investigation in this case,—which is always slow and involved—was done carefully, and verbal statements were shaken down from the supervisor, the man's workmate and other parties involved.

The supervisor submitted that the man had violated safety regulations and gone into an enclosed area alone when the rules specifically stated that he was not to do so.

His workmate was somewhat truculant in saying "Ah, I knew someone would be caught there someday. I've told 'em a dozen times the job isn't safe. There should be another man on the job."

Our investigation showed up two or three rather obvious errors.

● In doing the operation, which was quite esseitial, the safety cable was out of reach of the operator in an emergency.

● The safety rules did not specifically exclude him from going into the area alone —merely "that on all such cases a man must be on the platform of the machine, within call."

● The practice was admittedly hazardous, but no real thought had been given to taking specific preventive measures to meet an emergency. The safety and engineering departments did not even know that such a practice was regularly done.

Some recommended prevention measures are:

1. The safety cable is to be extended so it will be well within reach from any position.
2. The request by the union to have a third man placed on the job was partially met. An air whistle was installed so as to summon the third man whenever entry into the enclosed cabinet was required.
3. The rules were changed to read "in a less ambiguous manner." In other words, no entry into the enclosure is permitted unless a standby operator is first summoned.
4. A platform for easier access to the rolls was installed.
5. We made up a combination high air velocity rod and knife to remove the strips, thus obviating the need of the operator to reach into the rolls.

There you have it. The cause—to establish the facts and frustrate rumor.

The investigation—to establish the weak points of our safety measures.

The prevention—to set up the proper measures to eliminate further accidents.

ACCIDENT No. 2

The ambulance had called at the front door to remove an unconscious workman to the emergency ward of the hospital.

Rumor had it he was killed by poison gas. To add horror to the rumor—he was only one of several who had been exposed to the gas. Quickly then we must establish the cause factor, and dispel wrong impressions. This man was in shock so we could get little help here. We understood the operator had spilled some aniline oil and in attempting to clean it up had used some burlap bags to soak it up and had wrung the material out in a drum. This obviously resulted in the inhalation of fumes and in critical skin contact. Therefore a serious case of poisoning resulted.

Since the actual incident occurred about two hours previously, he was in shock and

immediate remedial measures were imperative; thus his prompt dispatch to the hospital.

It was all of five days (after complete blood transfusions to save his life) before we could complete the investigations with his help, and he admitted that he was involved only because he had tried to cover up an error. He had left the room to secure a cup of coffee contrary to regulations and had left a small valve open to fill a drum.

CAUSE AND ERROR

Our measures for ventilation were faulty and since the material being handled was hazardous, the margin for human error was too obvious. Thus we had to admit that our policy was as much the cause, as the error of the employee.

PREVENTIVE MEASURES for this hazard were:

(a) The liquid transfer was made automatic, both by a measuring device and by an automatic float shut-off.

(b) A retraining on the handling hazard of the chemical was undertaken for all employees of that department.

In taking corrective action after an accident, a great deal of skill and sound judgment needs to be excercised. In accident investigation there is no room for hot heads and unbridled tongues.

Even if there is a patent violation of a state code the interpretation as to whether the scope of that code covers the particular situation needs careful deliberation.

RECOMMEND CORRECTIONS

As mentioned before, corrective action can only assume the status of a strongly worded recommendation, we cannot enact legislation nor can we relegate any such action to the bargaining unit as a subject for negotiation. Accident prevention after all, can never be negotiated, if the safe welfare of any workman is at stake.

A skilled investigator will instill confidence in the minds of both management and men if he suggests a course of action, which, while not necessarily acceptable to both parties, will in the final analysis present a realistic solution to the accident problem.

The conference recorder of our discussion group was Mr. G. A. Miller, safety director of The Gates Rubber company, Denver, Colo.

The round table discussion was attended by 40 representatives of management and labor. Two phases of the subject took all the time alloted for discussion, i.e., cause and investigation.

Q. Should the cause of an injury and results of the investigation be posted on bulletin boards?

A. It was generally agreed that it would not be best to publicize this plant-wide on bulletin boards. Workers in the department involved should be fully informed by the department head after the investigation was completed.

Q. How soon should investigation be made after the injury?

A. As much as possible of the investigation should be made immediately after the accident, especially of the machine or whatever other agent was the cause. The injured man may not be in a condition for an investigation, but definitely his side of the story should be taken as soon as possible.

FINDING GUILTY PERSON

Q. Should investigation be made to find individual at fault?

A. The primary purpose of an accident investigation is to ascertain the unsafe act or condition involved. The only purpose served to interrogate an individual would be to get information on these particular aspects of the case.

It would definitely never be within the jurisdiction of the investigating man or group to prescribe any course of action against any one.

Q. Is an investigation best undertaken by an individual or a group?

A. This would depend entirely upon circumstances. It would seem obvious that the findings of any large group would have to be submitted or presented by an individual in order to get an accurate estimate of the injury.

Q. Should a joint labor-management safety committee assume the status of the official investigating party?

A. Labor feels strongly that this should be the case, or if not the whole committee, certainly representatives from both sides should take part in the investigation.

As a matter of interest, a poll showed that 50 per cent of the companies represented have joint labor-management safety committees. Local differences of policy were evident as to whether the nominees for the Union should be appointed by management or by the Union.

It is to be noted that the whole object of our meetings is merely to observe and record our findings as to the generally accepted policies governing these situations.

Depending upon the communications within the separate plants, a wide variation of company policy is evident. However, we have one common object, and that is to prevent accidents and have a workable program for the safe welfare of the workmen on the job. His livelihood must never be jeopardized by what he feels to be reluctance of management to set up safe working procedures.

As one listens to these discussions, one thing is obvious—the sincerity of both labor and management to agree on a commonly acceptable basis of mutual trust for the well being of all concerned.▲

HEART DISEASE IN INDUSTRY

by W. A. McCAUSLAND, M. D.

medical director, The B. F. Goodrich Footwear & Flooring co., a division of the B. F. Goodrich co., Watertown, Mass.

It has become increasingly difficult in industry to find employment for people suffering from heart disease. There are 280,000 persons afflicted with some form of heart disease in Massachusetts alone. Some 60 to 70 per cent of these are employable. Many of these are young people with families. Realizing that many of our own employees who are now in good health will, as they grow older, develop some form of heart disease, we are compelled by loyalty to save our medical jobs for our own people.

There are various types of heart disease. First, we have the congenital anomalies due to embryonic defects in development during the period when the heart and great vessels are formed from the primitive vascular tube. Briefly by name they are the acyonotic group, the cyanotic group, the tetralogy of Fallot, Eisenmenger's complex, coarctation of the Aorta, Patent Ductus Arteriosus, ventricular septal defects, auricular septal defects and Valvular Pulmonic stenosis. For some of these congenital conditions we can do nothing; whereas many can be corrected by new forms of heart surgery.

We have another big group of heart diseases caused by arteriosclerosis, rheumatic fever, syphilis, thyroid disease, diptheria, certain types of anemia, certain vitamin difficiencies, bacterial infections, aneurysms, arterial hypertension. This group is the more common of the heart diseases and usually can be treated by the physician over a long period of years. These acute and chronic congestive heart failures occur at any time of life. They may be said to constitute the bulk of the every day run of the mill heart disease.

CORONARY ARTERY DISEASE

The most dramatic of the heart diseases is Coronary Artery Disease, which is a narrowing or occlusion of the coronary arteries usually due to arteriosclerosis with the resultant imbalance between blood supply and cardiac muscle demands giving rise to anemia or damage to the heart muscle. Arteriosclerosis is the most common cause of coronary artery disease.

The etiology of arteriosclerosis is unknown but is frequently associated with high blood pressure, sugar diabetes, thyroid disease, high blood cholesterol levels, overweight and old age. Arteriosclerosis may be localized to the coronary arteries or may be a part of generalized arteriosclerosis.

Coronary artery disease is essentially a disease of middle life and old age. It is four times as frequent in males as in females and has an occasional family tendency. Approximately 90 per cent of cases occur

in the 60 to 80 year age group. It has been found in infants and children.

Coronary artery disease may produce no clinical symptoms. Only when damage becomes severe enough to cause a critical deficit of blood supply in proportion to myocardial demand do symptoms occur. The clinical picture depends upon the size and location of the myocardial region inadequately supplied with blood, the severity of the deficiency, its rate of development and its duration.

Angina pectoris or chest pain results from a short period of relatively mild ischemia. Myocardial infarction results from severe and prolonged ischemia in a more localized portion of the heart muscle often from an occlusion of one of the larger coronary arteries.

With coronary insufficiency we try to dilate the blood vessels and make them carry more blood—these people may live for 20 years under proper treatment. Myocardial infarction may occur with coronary occlusion and coronary thrombosis or without them. Small vessels may become occluded without myocardial infarction, because of a good collateral circulation.

Myocardial infarction is usually produced by thrombotic occlusion of one of the larger branches of the coronary arteries. The thrombus usually occurs in the narrowed channel of a sclerosed vessel often in the bed of an atheromatus ulcer or calcified plaque. It may form slowly or rapidly producing a thrombus which cuts off the blood supply to the area of heart muscle supplied by that particular arterial branch.

INDUSTRY'S PROBLEM

This may result in sudden death or hospitalization and slow recovery having various complications. The physician in industry is primarily interested in coronary artery disease. The majority of heart conditions can be easily detected by the stethoscope and the electrocardiogram. With these people we know just how much of a work load their hearts can sustain.

With coronary artery disease, it is a different story—as yet there is no medical test which indicates a man has this type of disease with no apparent symptom. I can take a cardiogram of an apparently healthy individual, find a normal reading, have him walk out of my office, and drop dead from a coronary.

Coronary disease is a relative newcomer to the field of medicine. Autopsies done before 1910 do not reveal this type of disease of the coronary arteries. We can blame civilization with our higher standards of living. Our full refrigerators containing foods which raise our blood cholesterol play a part in the whole general picture.

Lack of exercise, since we tend to use our automobiles to go to the next block rather than walk, is also part of the picture. Smoking, drinking and worry don't seem to have any effect. Hard work does not play a part unless there is some previously existing disease. The real criminals seem to be diet and lack of exercise. One of the most interesting proofs of these facts is that among Detroit automobile workers coronary disease was almost unknown in earlier years.

PLAIN FOOD HEALTHIEST

With improved working conditions and better pay there has been a tremendous increase in coronary disease. Our plain foods of earlier times seemed to give us protection against coronary disease. A program for control in industry is rather difficult because we have no tests which will indicate whether arteries are diseased or not.

Thorough physical examination including an electrocardiogram should be periodically made. If an employee indicates an elevated blood pressure, we should make sure that he undergoes treatment. Any underlying disease should receive prompt attention. Overweight must be controlled. Plant jobs must be inspected to make sure that the work is not too hard for the individual.

Many individuals will keep on working at a job which may be too difficult because of age or some other underlying disease. The pay check is too good to pass for an easier job with probably less money. These people we never see until the damage is done.

The returning coronary patient is always a problem—his physician's note simply states the employee is ready to return to work and we must determine if the job is going to be satisfactory from a physical standpoint.

The industrial physician must rely on adequate physical examination to control coronary artery disease.▲

RADIATION EXPOSURE IN THE RUBBER INDUSTRY AND CONTROL MEASURES

by R. A. MANNING
The Goodyear Tire & Rubber co., Akron, Ohio

Man in his search for an ever increasing standard of living resorts to an expanding technology that often advances the boundaries of knowledge and productive capacity, but also generates potential problems and requires adjustment to additional stresses in our environment. One such tool, from which we have not yet realized the full impact or benefits, is nuclear energy.

One must not feel that man's exposure to nuclear radiation is a new innovation—commencing near the end of World War II or with the formation of the Atomic Energy Commission. Man's environment has included exposure since time began because wherever one goes, there is always a small amount of so-called "background" radiation. This "background" radiation arises from naturally radioactive substances; uranium and radium and others found in rocks and soils as well as the radon and thoron that are given off into the atmosphere.

In addition, cosmic radiation from space is present everywhere and of course, like the natural deposits of ores, the exposure varies from one location to another, depending on altitude. For 60 years, man has been exposed to man-made radiation in the form of medical and dental X-rays. In fact, many U. S. citizens, today receive approximately the same amount of whole body radiation from the average X-ray fluoroscopic examination as from natural background.

Therefore, it is obvious that the mechanism of radiation exposure is not new. Only the increase in use and subsequent increase in potential exposure is new. As an illustration, on May 31, 1957, the AEC had licensed a total of 4,041 employers to use radioactive isotopes, of which approximately 40 per cent of these licenses are industrial firms.

In hopes of dispensing with one of the more controversial issues, it can be stated that the average exposure to "fall-out" from weapons testing, if continued at the average rate of the past several years, would be only 1/40 of the genetically important exposure due to background alone.

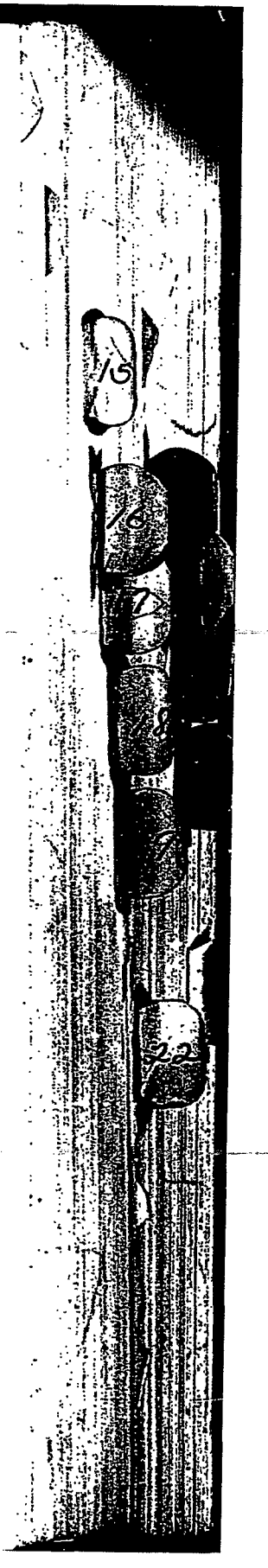
With respect to weather there has been no evidence that nuclear energy or nuclear explosions have contributed to any changes in weather or climate. In fact, one comment heard recently probably explains the situation adequately; the early caveman felt sure that they had never had such strange weather until they started using the bow and arrow.

Medical X-ray facilities as used in industry today are familiar to all of us and everyone will agree that their diagnostic value far outweighs any detrimental effect that might possibly exist. The radiation received from a chest film is higher than any other exposure that might be received under normal operating conditions from other uses of radiation in industrial operations.

X-RAY INSPECTION TOOLS

Industrial X-ray facilities and fluoroscopes are generally of higher peak voltages and are utilized to examine or inspect equipment or manufactured items, such as belts or tires, for internal flaws or specification quality that cannot be determined visually or by other conventional inspection methods. Exposures with this equipment can be high unless adequate control procedures are employed.

Radiographic techniques are used for essentially the same purpose as industrial X-ray facilities, but are usually somewhat more mobile and are moved to the item under inspection rather than moving the item. These are high energy radioactive, gamma emitting, sources requiring no electrical power; radium and cobalt-60 being two of the more popular isotopes used. Care must be exercised with such usage to prevent exposure to operating personnel and others in adjacent areas. Distance factors and shielding are usually mandatory.



One of the outstanding applications currently in use in the rubber industry is beta gauges for determination of weight of films and thickness of items such as films, treads and calendared stock. Beta gauges usually use carbon-14 or strontium-90 as source materials with a measuring head that detects the scattered radiation and reads directly on a calibrated dial in the units in which interested.

Through proper circuitry this measurement may be electronicly coupled with the process to provide control and make necessary adjustments with better accuracy and less effort on the part of the operator. As customarily used, such devices while operating present no hazard to personnel in the area.

MAINTENANCE HAZARDS

During maintenance procedures on the gauge some consideration must be given to prevent unnecessary exposure. If an emergency arises, such as a fire, it might be possible for the source to be vaporized by the heat and contamination spread over a large area. It is recommended that periodic air samples and area surveys be conducted in the vicinity of such gauges to insure that the integrity of the source container is being maintained.

Tracer techniques are being used extensively in the research laboratories to study the physical and chemical reactions in rubber chemistry, particularly with regard to accelerators and anti-oxidants. "Tagged" compounds are made up containing various radioisotopes of carbon, sulphur and zinc.

These materials are handled in laboratory quantities and have contributed a great deal to understanding some of the basic processes involved in rubber compounding and technology. Their use is confined to individual laboratories where stringent cleanliness standards are maintained to prevent the spread of contamination. Waste disposal is monitored carefully so that radioactive materials are not released into public sewage or water systems.

IRRADIATION FACILITIES

Various irradiation facilities for research and development purposes are used in some companies and projects in conjunction with governmental reactors are popular. These facilities are used for testing properties of materials under the stress of high radiation density. Another promising application is to promote polymerization of various monomers and tires have even been cured by this method.

Sources range from multi-currier cobolt-60 sources to fission products from reactors. Extreme operating precautions are necessary for experimental work of this type including heavy structural shielding, safety interlocks and a full complement of personnel protective devices.

Anti-static bars employing alpha particle emitters such as prolomuim are commercially available, and although not used extensively in the Rubber Industry, may have applications in some of the diversified operations conducted by rubber companies.

Future applications are numerous and undoubtedly many still beyond our present comprehension. Subsequent applications will necessitate that sufficient thought and planning be given during process development, engineering design and production use.

In order to receive radioactive materials legally in sufficient quantities to be potentially hazardous, it is necessary to be licensed by the AEC and meet the health and safety standards as outlined by Federal regulation. Furthermore, nine states at the present time have additional state registration requirements as a further safeguard. This means that an original installation then is a safe installation for the employee.

FEDERAL, STATE REGULATIONS

By the use of design criteria and operating procedures, audited by AEC inspection teams, the installation or use is kept safe. Personnel protective devices are utilized extensively, where needed, and include film badges, monitoring chambers, and dosimeters. Area surveys and air samples are performed by regulation to maintain the license, and at other intervals as indicated by operating difficulties.

Radiation exposure to personnel in the rubber industry is not a new environmental condition. The application of nuclear techniques to product development and process control can be adequately controlled so as not to present a hazard to personnel. The employee in this industry is not receiving significant radiation exposures at this time and the knowledge for prevention of undue

exposure is available so that emergency planning can reduce or alleviate potential exposures that might arise from catastrophes such as fires or explosions.

The benefits to be derived from the use of nuclear energy techniques are tremendously greater than the risk of occupational injury with our present standards.▲

OFF-THE-JOB SAFETY

(Round Table Discussion)

EARLE R. GARDNER, Conference Chairman

We are having a lot of off the job injuries via the power lawn mower, hunting and home workshop. Statistics have proven we are losing a lot more production and causing human suffering by off the job injuries than we are by on the job injuries.

It is recommended that those of you who are not keeping records regarding off the job injuries should do so for you will be amazed at the amount of time your employees are losing due to off the job injuries.

One question asked was: What civic organizations as safety men or representatives of your local unions can you obtain help from?

Answer:

1. PTA
2. American Automobile Association (AAA)
3. Automobile traffic associations.
4. The garage associations.
5. The mayor's traffic committees.
6. Church groups.
7. From the ladies.
8. House organs.
9. Newspapers.
10. State Departments of Safety and Hygiene.
11. Union locals

Following is one of the suggestions on how to start an effective off the job safety campaign.

—An analysis of your experiences for one year.

—Disseminate information through your regular line of communications as you do on the job safety campaigns.

—Form on off-the-job safety committee.

—Form a family safety committee consisting of the wives and children of your employees.

—Hold a family safety month in your community and ask all the civic organizations to participate.

It was brought out that the automobile manufacturers are now putting the emphasis on safety and comfort in their products, rather than on horsepower.

The formula for measuring the frequency and severity was the subject of considerable discussion and it was found that there was a wide difference of opinion as to how this should be figured. However, it was generally agreed that the National Safety Council's formula was at least basic.

Suggestions of ways to reach the home with safety messages were:

1. Post the answers to safety questions on the bulletin boards in the shop and make phone calls to the homes with a cash incentive for the wife having the correct answers.
2. Mail the house organ direct to the homes.
3. Draw a comparison for the employees between plant safety and off the job safety, such as in plant trucking and traffic safety, machine shop safety, to the home workshop.

"Off the job" safety will keep the production lines rolling and families united and happy!▲

COMMUNICATIONS IN SAFETY

(Round Table Discussion)

T. J. CAIN, JR., Conference Leader

Report on Round Table No. 4—*"Communications in Safety"* by T. J. Cain, Jr.

Conference Leader: *T. J. Cain, Jr., Director of Safety, The B. F. Goodrich Co., Akron, Ohio.*

Conference Recorder: *N. C. Longee, Safety Supervisor, Passaic Plant United States Rubber Co., Passaic, N. J.*

T. J. Cain pointed out that we get from a conference what we put into it. In a few brief words he stressed the importance of effective communications and laid the groundwork for our work. He announced a prize of one dollar to be paid to the first one to utter the "magic word" which he felt was the real key to communications in safety. Each person was asked to stand, identify himself and name one communication medium he thought important:

—A weekly newsletter.
—Word of Mouth.
—Messages in the plant publication.
—Personal contacts.
—Daily memos.
—Daily reports of conditions, and follow up.
—Following established lines.
—Bulletin boards.
—Monthly meetings.
—Reports from line supervision to superintendents.
—Weekly meetings—use key men.
—Written reports to the top, sent back down the line as directives.
—Daily contacts—even by telephone.
—Boards showing comparative standings.
—Five-minute safety meetings.
—Post rules in departments, issue rule books.
—Contests.
—Direct communication with the worker.
—Direct communications, but through supervisor.

At this point the ideas began to emerge, and the following were added to the list: Safety book racks, slogan contests, letters to homes, cards to homes on special occasion, visual presentations, such as movies, sound slides, photo projection and safety workshops, a device the Union is beginning to use.

Glenn Gross of Firestone Co. used the magic word when he stressed the importance of listening to the other fellow, and getting his ideas. Cain was delighted to hand over the dollar prize.

John Kumpel AFL-CIO urged that material be presented in a clear, dignified, forceful and attention-compelling way. Mobile displays and message tapes were suggested. Cain reported briefly a contest that ended in the low man serving as valet for the winner at the Congress.

Kumpel said the URW has a film library in great demand. He commended the film, "It's In The Cards." It was noted that the National Safety Council is a good source of safety films. Among other visual aids to communications, Cross uses a 16 mm camera and makes his own films; some plants are using Polaroid cameras, equipped to deliver slides; Dale Knox of Dayton Rubber, uses a display of safety shoes that have saved toes.

Some plants hold meetings on company time; others have special arrangements. J. M. Papp, of Goodrich, suggests that at any meeting, you will learn more by listening while the men talk. Cain noted that an intentional error checks on whether or not a report has been read. Cain also recommended that symbols used in a report be explained, in case the message doesn't get through.

Cain stressed the importance of a plan for use to combat rumors, in case of disaster. Public relation is extremely important.

Cain read off a number of ideas represented by various displays and recommended we look over the NSC exhibits for more. Although ideas were still coming in, time ran out and Cain closed with the point that "what we do is more important than what we say" when we are trying to communicate with people, and that one of the best things to do is—listen to the other fellow.▲

THE HUMAN FACTORS IN SAFETY

by ROBERT L. CRANE

manager, Supervisional Training, The Goodyear Tire & Rubber co., Akron, Ohio

Goodyear Tire and Rubber company emphasizes safety through programs in supervisional training conferences, and the safety department.

A program, entitled "The Human Factors in Safety," was presented to approximately 3,000 supervisors in 15 Goodyear plants. The program consisted of four, one-hour sessions and stressed the importance of supervisors' using good *human* relations in accident prevention. We have had programs on human relations, and many on safety. But this was the first attempt to tie them together in one program.

The three objectives in putting on the program were:

1. To help supervision recognize the types of behavior that frequently lead to accidents.
2. To help supervision analyze daily reports for accident prevention.
3. To emphasize that good human relations plays an important part in accident prevention.

We started the program with a review of the four foundations for good relations which we and a good many other companies have stressed in human relations programs:

- Let each person know how he is getting along.
- Give credit when due.
- Tell him in advance about changes that will affect him.
- Make the best use of each person's ability.

LEARN EMPLOYEES' PROGRESS

In session one, we concentrated on the first foundation. Let each person know how he is getting along—safety-wise. But first we must know how our people are doing safety-wise. There are two major sources of information that can help supervision find out how their people are doing:

1. REPORTS

The reports available to supervision are:

1. Foreman's reports of injury
2. Hospital or first aid reports
3. Attendance reports
4. Production reports
5. Quality reports

In our sessions we discussed how each of these reports can help us prevent accidents. For example, foreman's reports point out: accident repeaters, hazardous operations and violations of safety rules.

Attendance reports reveal conditions of health that lead to accidents, or that people are having difficulties at home. Production and quality reports may point out poor job conditions or personal problems of the employee. These reports can give us a lot of information that will help us to build a road to a better safety record.

2. BEHAVIOR

However, reports are not the entire answer to accident prevention. The other source of information is the behavior of our people. There are seven types of behavior which are accident hazards:

1. Anger
2. Indifference
3. Confusion
4. Fatigue
5. Carelessness
6. Daydreaming
7. Worry

We ended the first session with a discussion of what action can be taken when these types of behavior are observed.

Session two was devoted to the 16 safety rules of our company, because to let a person know he is breaking a safety rule we ourselves must know what the rules are.

To give credit to our people for following the safety rules we must know what the rules are. So we attempted to get our supervision thoroughly familiar with the rules.

We used this technique: We picked the key word out of each safety rule and put it on a three by five inch card. One safety

rule says ***not to use air hoses to blow off our clothes,*** so we put the words ***air hose*** on a card.

We distributed these 16 cards to the conferees, and in discussion asked "Who has the card that says *"air hose?"* when somebody raised his hand, we asked what the safety rule was about air hoses. Normally they came pretty close to the rule, and we discussed each rule and its importance. The conferees brought out many examples of accidents that happened because the rules were broken.

LOCKING-OUT RULE

Session three was devoted to one of the safety rules: "The zone engineer or engineering supervisor is responsible for properly safeguarding against dangerous conditions developing during the progress of a repair job." The area of safeguarding machines from being started when being repaired is potentially very dangerous.

In our company some machines are quite large, extending three to five stories high. It would be easy for a worker to start such a machine when someone was working on it, if proper precautions weren't taken.

To drive home the necessity for "locking out" a machine every time it is worked on, we showed a film, "It's in the Cards," produced by the Abitibi Paper co. of Canada. In our conferences we asked the conferees to note the behavior of the people to see if they could pick any of the seven types we discussed in session one.

We concluded the session agreeing that it is important to observe the behavior of our people to prevent accidents.

PERSONAL TRAITS EMPHASIZED

In our last session, we discussed how people are both different and alike. Sometimes we overlook that people are so different, one from the other. To demonstrate this the conferees participated in a little experiment. We gave them a number and asked them to double the number and then re-double as far as they could go in 60 seconds.

After the minute was up, we read correct answers and asked them to mark on their paper how many times they had doubled the number correctly. In every class there was a terrific range from a low of two or three times up to 20 or 21 times. It was pointed out that this large range of differences was true in any group of people for any ability trait or characteristic.

We discussed the people who would most likely cause problems, and concluded that most problems would come from those at either extreme of the range. Then we said that although every one is different, there are distinct and similar types of personalities.

Five of the common types of personality that can cause difficulties are:

1. The fellow who is sloppy
2. The tough guy
3. The show off
4. The loud mouth
5. The practical joker

The *sloppy man* is frequently lazy, leaves things lying around. *The tough guy* thinks safety is for sissies. He's the fellow who runs the machine with the guard off. He's much too tough to get hurt! The *show off* is interested in calling attention to himself. He will take chances to get people to notice him. The *loud mouth* attracts attention to himself by telling others how to do their job. He's the authority on everything. The last one, the *practical joker* can give us a pretty rough time.

The problem is not how to recognize them but how to handle them. The session ended with a summary of the four sessions and the four foundations for good relations. Any house of safety would have to be built on these four foundations:

1. To let each person know how he is getting along, supervisors must know the accident, hospital, attendance, production and quality reports with an understanding through observation of the behavior of our people.

2. To give credit when due, supervisors should have an attitude of fairness and sincerity.

3. To tell people in advance about things that will affect them "safety wise" they must know the safety rules.

4. To make the best use of each person's ability they need skill in leadership remembering that everybody's different and recognizing that people must be treated as individuals.

These are the foundations upon which any house of safety must be built.▲

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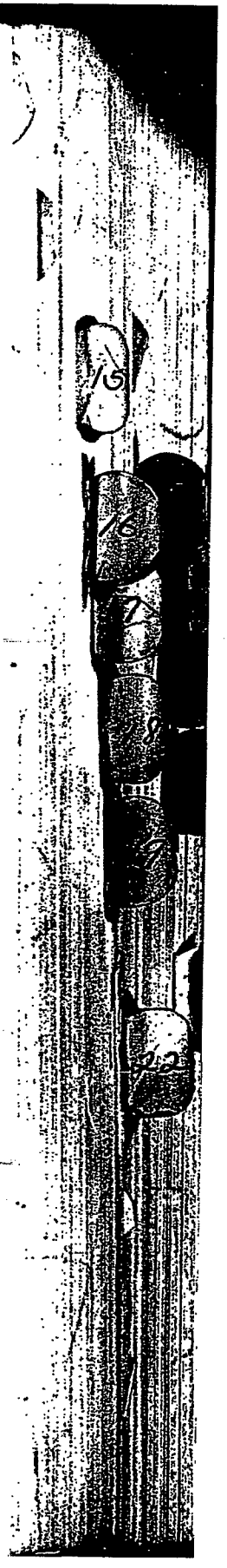

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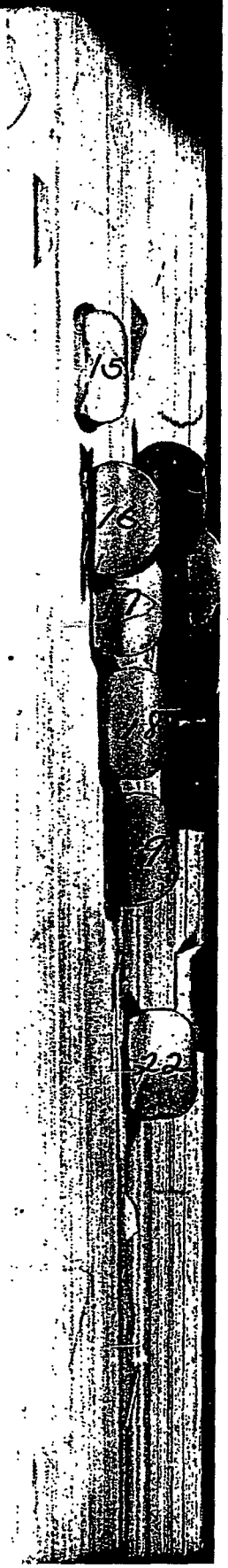

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