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glass and ceramics; rubber and plastics



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59th NATIONAL SAFETY CONGRESS

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Glass and Ceramic Sessions

EFFECTS OF THE CONSTRUCTION ACT ON GLAZING OPERATIONS

By CHARLES R. HAINES

Manager of Safety, Contract and Supply Department, PPG Industries, Inc.

The Construction Safety Act of 1970—which took effect in April, 1971—is making a major impact on the construction industry in the United States by requiring safer methods of construction and eliminating the unsafe practices and conditions of past years. Initially, the cost of construction will be somewhat increased; however, as accidents are reduced, the benefits will offset these increased costs and eventually may result in overall savings to the construction industry. Management must accept the new federal legislation in a positive and constructive manner and inform employees that the organization is making every effort to comply, not only for legal reasons but, more important, for the increased safety and health of all employees. Remember, the intent of the law is to reduce injuries and fatalities.

If your organization is in the process of implementing procedures for compliance with the new construction safety act, you may be interested in the following general approach and specific actions being taken by PPG Industries' Contract and Supply Department.

First, it is necessary to obtain sufficient copies of the law from the Government Printing Office. Then someone in your organization should be designated to become familiar with all sections of the law with which you must comply. After this is completed, all management personnel must receive training on the pertinent sections of the law, and it is recommended that they receive copies for their own use and as a reference guide. Consideration also should be given to condensing the major sections applicable to your operation and providing a check list for evaluating your current state of compliance. PPG In-

dustries has done this, both major condensations and brief condensations.

Compliance with the law is next. A survey should be conducted to determine any areas of non-compliance; then these areas should be divided into two categories:

1. Those which can be corrected with a minimum amount of time and money.
2. Those which will take considerable time, capital, or both, to complete.

For major areas of non-compliance, knowledge of the procedure of obtaining a "variation from safety and health standards" may be helpful.

If substantial engineering or other practical difficulties exist, a contractor or subcontractor may file a written request for variation from any of the safety and health standards with the director of the Bureau of Labor Standards.

If it is determined that the variation will not prejudice the safety or health of the laborers or mechanics intended to be protected by the standard, the variation will be granted with such modifications, restrictions or qualifications as may be considered necessary or appropriate.

Major provisions of the Construction Safety Act of 1970 include the following:

1. No employee shall be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous to his health or safety.
2. An accident prevention program shall be initiated and maintained by the employer.
3. Such a program will provide for frequent and regular inspections of the job sites, materials and equipment to be made by competent persons designated by the employer.

4. The use of unsafe machinery, tools, materials or equipment is prohibited.
5. Only qualified employees are permitted to operate equipment or machinery.
6. The employer shall instruct each employee in the recognition and avoidance of unsafe conditions.
7. Each employee must comply with safety and health standards, rules, regulations and orders issued under the act.
8. Employees have the right to file a written complaint with the Department of Labor against the company for any violation of the act, which, if determined reasonable, will initiate an inspection by the Labor Department.
9. Inspections under the act will not be announced in advance and inspectors will have virtually unlimited rights of entry and inspection of any business.

FIRE CONTROL IN GLASS FORMING DEPARTMENTS

By DONALD HOBBS

Safety Dir., Anchor Hocking Corp., Lancaster, Ohio

Ever since the discovery of fire mankind has realized that, although fire is one of his greatest of friends in providing heat for his very existence and the source of power for his production capabilities, it is a formidable foe. Out of control, it is one of the greatest threats to life and property and has caused the failure of many businesses. If today is an average day there will be about 350 industrial fires in the United States. Of all industrial fires 70 per cent result in at least a temporary shutdown. Tomorrow morning thousands of people will be out of work because their jobs went up in smoke today. Some will go back to their jobs in a few days or a few weeks. But many of them will never go back to their job, because a large per cent of the businesses involved in fire are compelled to close their doors due to failure to meet sales commitments and loss of market potentiality.

Fire is indeed a serious and continuous threat in the glass industry. We must constantly seek better ways to oppose fire's destructive power with collective action. The most elaborate fire prevention programs do not prevent all fires. Of course, fire prevention is important, but in spite of all efforts in that direction, fires do break out in our forming department. Most fires start small and can be extinguished with comparatively little damage through prompt sounding of alarms

way but six people died, thousands of people were out of work, and a \$45 million plant went up in smoke.

Corrective or preventive measures can be taken to greatly reduce the possibility of losses from fires. We at Anchor Hocking believe that the best method is through education and training—learning how to recognize fire hazards and how to correct or control them. Due to the very nature of glass forming we have several small fires each day due to molten glass and by lubricating the forming molds on the machines. We supplement training by providing safeguards for the plant and our manufacturing process. However, no safeguard is foolproof and no building we have is fireproof. Constant alertness is the only way to control or eliminate the breeding of fires. This is taught in all supervisors courses and orientation of new employees.

How do fires start?

Most fires are the result of carelessness and neglect. If we know how fires start they can be avoided. To start a fire three basic elements are needed; fuel, oxygen, and heat. This we have at all times in our forming department.

We use different ingredients in our forming department when we are making various kinds of glassware. For instance, light oil is used to put on hot molds to lubricate molds and put a coating on the mold to make a smooth finish on glass. This oil causes a flash of fire. We manufacture some 3,700 different items of glass used in home and industrial facilities, such as sealed beam headlights for automobiles and meter covers that are used in your homes. This means several lubricants for the molds have to be used, such as silicone, renite, and other light oils, depending on the type of glassware being produced.

There are also several different types of gas burners used along the way to keep the glass hot while it is moving from forming machines to glazers, lehrs, etc. Everything in our forming process is precision and high speed, so it is necessary to be alert for fires at all times.

At the present time at Plant No. 1 we form about 550 tons of glass in a 24-hour period. So you can understand that it is necessary to eliminate fires immediately. We figure if a

fire gets out of control above a machine the cost of the fire is over \$1,000 for each minute it burns, and after five minutes it squares itself in cost thereafter. You can see it is necessary to have a very efficient fire brigade.

Types of fire equipment used are: CO₂ fire extinguisher, foam fire extinguisher, dry chemical, pressurized water, manual water controlled fog system over machines, manually controlled deluge system in roof of forming department, one inch hose reels with loaded stream and adapters for city fire equipment, and 2½ inch fire hose. All of this equipment is worthless unless it is used properly and quickly.

What to do in case of a fire?

Every man in the forming dept. is taught how to use fire extinguishers. If these do not control the fire somebody goes to a station (Telecontrol) and tells the operator there is a fire on a certain machine. The Telecontrol operator dispatches the fire brigade to the scene of fire. The shift foreman is the fire chief. He then pulls the fire whistle which operates by air to make sure everybody is alert. At this time no other person is involved in the fire except the fire brigade. In other words, every machine stays in operation until the fire chief gives them word to stop. This is done by using the Telecontrol station phone; the Telecontrol center in turn announces the fire and the location over loud speaker.

However, when the fire brigade is called out, the chief also pulls the city fire department alarm. Most of the time our machines never shut down and fires are usually extinguished before the city fire department arrives.

We use one man on each bank of a deluge system and one man to direct him on how and where to turn on the systems. We never turn more than four systems on at any one time. These are usually four to six inch lines. We have three banks of deluge systems in the forming dept.

The forming department labor foreman goes to the roof with six men to use the loaded one inch fire hose with No. 307-B Powhatan straight stream and fog nozzle with shutoff valves. These are used to knock out fires in areas where the deluge systems cannot hit, such as under the beams and in corners.

TANK TEAR-OUT AND REBUILD SAFETY

By CHARLES KRAFFT
Safety Dir., Works No. 12, PPG Industries, Inc., Clarksburg, W. Va.

Tank repair—those words can send chills down a safety director's spine. Again, one of the most dangerous jobs encountered in glass manufacturing must be done. Senior employees may be doing heavy construction work which they are not accustomed to, or you may have new employees doing work they have never done.

How do you complete a repair without serious injury to your employees?

One of our plants, we feel, has come a long way in tank repair safety. They have completed five tank repairs in the last three years and had only one lost time accident. Their last repair was completed in April of this year. It was a major repair and included the digging of 300 tons of cullet. Total injuries were 20 first aid cases and one doctor case. Several months prior to the repair, the engineering staff began working up the critical path for the repair. From this, they were able to determine what would be done, when, and by how many men.

One month before the repair started, the safety policy committee met to discuss tank repair safety procedures and agreed on what procedures would be followed. At this meeting, the manager indicated that he wanted the safety of each employee to be paramount in any operation undertaken.

Safety inspectors for each shift were chosen from the line foremen and the engineering staff. These inspectors were selected by the tank superintendent, repair engineer, and safety director and were approved by the manager. The inspectors met several times with the safety director prior to the repair. In these meetings, the safety director reviewed the safety experience of previous repairs with them.

The safety inspectors were instructed that they were assigned to the repair for the purpose of inspecting, not as supervisors. They were not assigned to relieve the foreman of

his safety responsibility, but as added insurance for safety. Because of changing conditions on a repair, they were asked to be constantly on the move, inspecting all aspects of the repair. Specific hazards on each job were discussed with them.

Meetings were also held with the foremen on the repair. The foremen were informed that safety was their responsibility. They were to complete reports on all injuries. They were instructed to hold tailgate safety meetings before each shift started in order to point out the safety hazards which might be encountered in each day's work, the necessary precautions to be taken, the safety equipment to be used, and a rundown of accidents on the previous shift.

When men were changed from one job to another, job safety instructions were to be given. It was impressed on the foremen that the safety of the men was their responsibility, not the safety inspectors.

I have tried to point out that the responsibilities of the safety inspectors and the foremen were different, although they worked together as a team. They both had a common goal: to get the work accomplished without injuries and as quickly as possible. The safety inspectors gave the foremen information concerning injuries on other shifts, near-miss accidents, and assured that safety equipment was available. The safety director and plant engineer met with the contractor's superintendent and foremen to let them know the ground rules of safety on the repair.

Now let's look at safety equipment which was worn on various jobs. The tank repair area was designated as a hard hat area; the area was posted and the rule enforced. All compressed air hoses for jack hammers and air operated tools had to have safety pins to lock the Chicago connectors so they would not come apart. Following is a list of personal protective equipment used on various jobs:

Men digging cullet were required to wear safety sleeves, monogoggles, leggings, gloves, leather cuffs, hard hats, face shields if needed, and safety shoes. Men handling bricks or blocks with no glass on them were required to wear Sankey foot guards, gloves, hard hats, monogoggles, and safety shoes. Men handling bricks or blocks with glass on them were required to wear sleeves, cuffs, gloves, Sankey foot guards, hard hats, monogoggles, and safety shoes. Men cleaning blocks with glass on them were required to wear monogoggles, sleeves, gloves, hard hats, cuffs, Sankey foot guards if the blocks were out of the wall, leggings, if they were cleaning blocks in the wall, face shields if needed, and safety shoes.

The hazards encountered on the cool down of this repair were typical of those on any repair. When the cool down started, all jack bolts and turn buckles were given a liberal dose of penetrating oil. This helped to make the bolts turn more easily. Remember, these bolts had not been turned in several years and the areas where the men worked were hot and cramped.

Close supervision of a cool down crew is a must. Whenever possible, scaffold boards should be used to give men proper footing. Wrenches must be in good condition and used properly.

When the cool down is complete, the tear-out crew proceeds in dropping any section of the cap that needs to be replaced. The buckstays of the section of cap to be removed must be braced to keep them from falling. This is important because when a section of cap is down the buckstays lose their main point of top support and can fall. To prevent the crown skew steel from falling and to insure the safety of the men, clips were welded on the steel skews. Though these skews are tremendously heavy, they merely sit on the buckstay brackets and have been known to fall with movement of the tank.

After the skews were secured, the tank basin area was cleared of all men. Jack hammers were rigged on the catwalk above the section of cap to be dropped. The hammers were tied off with rope to prevent them from falling should the operator lose control. Working from the catwalk, the operator started at one end of the cap section and

hammered out the key blocks. As the key blocks were knocked out, the section of cap fell.

Equipped with proper safety equipment, the men trucked out the brick. Men pushing wheelbarrows did not wear Sankey foot protection but were required to wear other equipment. When power conveyor belts are used to haul out the brick, procedures must be established to control conveyor belt hazards.

Metatarsal foot protection is a necessity for those handling brick. Far too often, as a man picks up a brick it breaks, and he is left holding a piece while the rest falls and hits his foot. It should be noted, however, that foot protectors can be a source of tripping hazards until the men learn to walk with them.

Improper handling of bricks can also result in injury to the hands and fingers.

Ramps must be installed to get the materials out of the tank basin. These ramps must be constructed properly since many heavy loads of brick will move over them.

The glass surface where the men will be working will be slippery and, in some instances, rough if the glass spills as it cools down. It may be necessary to utilize plywood sheets to assure that the area is safe to work on.

Proper lighting is very important on any repair. This means that the many temporary lighting situations will have to be watched closely.

The same hazards exist when the brick work on the rear wall, breast wall, drop arch, floater hole, skim kiln, and front wall is torn down. Removal of the basin blocks presents additional hazards. These blocks are heavy and, in most cases, have glass on one or more sides. Safety equipment requirements change. The foremen must see that the men wear the necessary equipment to protect themselves.

Any arch that is not going to be torn out should have a wooden form installed under it for support so that vibrations will not shake it down. This is particularly true where the steel has to be let out to remove other brick work.

You will note that port uptakes, wall and crown tear-out, and regenerator tear-out

safety regulations were not mentioned with the rest of the brick tear-out. These present additional safety hazards that need to be looked at closely. Let's look at the port uptakes, wall, and neck tear-out first since they should be torn out before the regenerator. The uptakes and necks are supported by transverse arches that sit on the checker chamber walls. The regenerator walls are held in place by supporting angle iron and tie rods.

Before the tear-out starts, the checker chamber must be cleared of men because of falling bricks. The binding steel is loosened around the uptakes but not the necks. The necks are made of cast blocks, not bricks. These blocks are heavy, and they are not removed until the uptakes are out.

The crown of the uptake is dropped, the side walls are torn down, and the bricks are trucked out. As the uptakes are torn out, the steel walkways between the uptakes may become unsafe since they are supported on tie rods and brick work. It may be necessary to support the walkways with additional steel or take them out and replace them with scaffolding.

Toe boards and barricades must be built around the area to keep men from falling into the hole and to keep items from falling into the checker pits. Binding steel should be taken out; if left standing, there is danger of it falling over and hitting the men.

In many repairs, it is not necessary to remove all uptakes. The transverse arches of the uptakes left must be given a thorough inspection to see if there are loose bricks. Forms should be installed under them to keep the bricks or arches from falling when the regenerator tear-out starts.

Before the regenerator tear-out starts, scaffolding must be installed in front of the end walls of the checker chamber. This scaffolding is high and hand rails and toe boards must be installed around it.

Tear-out men start at the top and remove the end wall. When the end walls are down, scaffolding is installed over any floor gaps and checker brick can be trucked out. Additional hazards may be encountered in the tear-out. The checker bricks are badly burned and are subject to easy breakage. If

the checkers are dusty, it will be necessary to wear respirators.

Constant surveillance is necessary in order to prevent items from falling. As the checker brick is taken out, the side walls have to be inspected. If they are bad or there is danger of them falling, they have to be torn down or braced to protect the men.

In some instances, the checker bricks have to be hoisted out of the checker chambers. If this is the case, hoisting safety regulations will have to be instituted. When checker bricks have slugged over, jackhammers and pry bars will have to be used. Jackhammers with noise mufflers should be used and hearing protection required.

As the men take brick out, they should terrace back in order to have a good place to stand and not have to work off scaffolding.

We have talked about brick handling to some extent in all phases of the tear-out. Some do's and don'ts that must be enforced when men handle brick are:

1. Don't throw brick from one man to another.
2. When passing brick, be sure the man receiving has hold of it before letting go.
3. Where possible, use conveyors or slides.
4. When using conveyors, be sure the man putting them on the conveyor does not put them on faster than his buddy can take them off.
5. When using a slide, make sure the man taking them off does not get his fingers mashed between bricks.
6. If powered conveyors, make sure the man taking the bricks off does not get his fingers mashed between bricks.
7. Good housekeeping is a must on any repair. This often overlooked item can cause injuries. The money spent for clean-up will pay for itself.

Tunnels connecting the checkers to the stack have to be cleaned. There are hazards connected with tunnel clean out. The stack damper and reversing valves should be raised during the clean out. Since they are supported by cables, it will be necessary to block up under them so, if a cable breaks, they will not fall. Men working in the tunnels must wear respirators as this is an extremely dusty job. To protect the eyes from dust, cover goggles

should be worn.

The most dangerous job on a tank repair is the removal of cullet. This is particularly true if it is not possible to drain. After the cool down, the glass will still be hot. This means it will be much harder to work. Glass in the tank basin is approximately four feet deep. Where it is not possible to drain, the cullet must be removed with jack hammers, bars, and shovels. Men will be required to work under low arches, drawing machines, and in corners. They will be working in corners of the basin wall.

Let's look at some of the hazards associated with digging cullet and what can be done to prevent injuries. First, all men on the cullet digging crew must wear their protective equipment. Hard hats protect the man's head, monogoggles protect his eyes, sleeves and cuffs protect arms and wrists, gloves protect hands, leggings with metal flanges protect legs and feet. Face shields may also be needed, but in no case can face shields replace monogoggles. Ear protection should also be worn as the noise level will be quite high. Air hose connectors must be pinned so they will not come apart. Normally, points and asphalt spades are used in the jack hammers. These should be kept sharp. When points are used, the cullet comes out in large chunks and will have to be broken with a sledge hammer.

There is an art to breaking up lumps of cullet. Most men want to take a full swing with a hammer. This causes the hammer to bounce and small pieces of cullet fly—and the chunk is still intact. The proper way to break up chunks of cullet is to gently tap with the sledge hammer, first on one side then the other. This will quickly break the chunk and will not cause glass to fly.

Most chunks of cullet have sharp edges. These edges can cut through gloves. When men are handling chunks, they must be constantly alert to this.

When asphalt spades are used, cullet usually comes out in small pieces which are easily shoveled up. We feel that cullet can be dug faster with a spade than with a point; however, both are needed.

The first step in digging cullet is to start with an area and go straight down. Until the

tank bottom is reached, cullet removal is extremely slow; however, once the bottom is reached a new hazard comes into the picture. The jackhammer operator will be standing on the face of the cullet. He must constantly watch his footing. If he slips, he will slide down a four foot face of cullet and it can cut him to pieces. Cullet is usually worked by a three man crew, each taking his turn on the hammer, the bar, and the shovel.

When working close to the basin wall, care must be taken that the operator's hands are not caught between the side or top of the wall and the hammer handle. Cullet dust may be quite heavy at times. Sprinkling the area with water does a good job of keeping the dust down.

Particular care must be taken when working under the drawing machines and under arches. Men will be working in cramped positions and there is a danger of back strains and hernias.

As the cullet is loaded in trucks, much will be spilled on the floor. Hence, cullet must be constantly cleaned up, or the truckers will slip and fall.

When working cullet with a bar, the men must learn to work the seams. They must constantly protect their hands as they pry. If a bar slips, you can be assured the man will have a badly lacerated hand when his hand is caught between the bar and glass.

It would be nice, indeed, if the cool down and tear-out would go as described. Many of the jobs we have discussed will be going on simultaneously. For instance, cullet digging will be going on in addition to brick demolition. Tinnermen will be removing air lines, mechanics will be working on drawing machines and tank ironing, and pipe fitters will be making piping changes. There may even be steel workers making structural changes. Safety inspectors on a repair must be constantly on the move. Thirty minutes can make a big difference in what is going on in an area.

Another item that can affect the tear-out is the weather. If it is cold outside, it may be extremely cold on the repair. Temporary heaters must be supplied. These heaters can create new hazards and must be coped with.

Many glass tanks are equipped with radio-

active glass-level devices. Before the repair starts, the shutter on these devices must be closed and locked out so no radiation hazard exists.

There are many gas lines around a tank. Where possible, the valves must be closed and the line bled off. When this cannot be done, the lines must be protected to keep them from being broken.

Housekeeping is a constant problem on a repair. However, ways can be found to keep the area clean. On any major repair you will have a large number of people working and a great amount of traffic in the area. If housekeeping is let go, the combination of men and machines plus a dirty area can only spell disaster.

It takes a great amount of teamwork between engineering, supervisors, hourly workers, and safety people to have a major, injury free tear-out. It can be done if all work together.

When the rebuild starts an additional set of hazards exist. Brick layers will be coming in. Bricks will have to be cut and mud will have to be mixed.

Let's look at these two jobs first. Wet cutting brick saws should be used. This type of saw eliminates the dust problem but presents other problems. All brick cutting saws must be grounded to protect the operator. Water spillage should be cleaned up as quickly as possible. The sawyer should be standing on duckboards and should wear rubber gloves, rubber boots, rubber apron, and face shield in addition to the required hard hat.

If dry saws are used, proper ventilation must be installed and the sawyer should wear a respirator. These saws must be grounded also. Offal from the saws must be contained and hauled off periodically.

The mud mixing operation presents water hazards, too. If the mixers use electrical means to mix the mud, there is danger of electrocution; the electric mixers must be grounded. The mud itself is very slippery and any spills should be cleaned up at once.

Good housekeeping around the saws and mud mixing area is a must.

In most instances, before the rebuild can start it will be necessary to install forms to hold the brick in place and scaffolding for the

men to stand on. All scaffolding must be installed properly. This scaffolding will hold men and materials which can total a great amount of weight.

Many of the forms used in tank rebuilds are massive and have to be constructed to hold thousands of pounds of weight. In many instances it will be necessary to work in tight and congested places. Where possible, use adequate manpower and make use of rollers and bars etc. When the forms are removed all nails must be pulled or bent over to prevent foot punctures. A good carpenter group can go a long way to help make a repair injury free.

While the carpenters are setting forms and scaffolding, bricks and blocks for the rebuild are being brought to the site by fork lift trucks and work-savers. This causes a great amount of traffic and congestion. Great care must be taken to see that the proper brick is brought to the site and no other. Space around the repair is at a minimum, and if the work is to progress safely, when brick is no longer needed it must be trucked out at once to make room.

The cardboard, steel banding, and empty pallets must be removed as quickly as possible. This gets rid of many tripping and stumbling hazards. In addition to this, cardboard and pallets are a fire hazard.

Where possible, use conveyors and brick slides to get bricks into the area where they will be used. Where this is not possible, the bricks will have to be passed man to man. The personal protective equipment we have discussed previously must be worn by the men handling brick and blocks.

Where possible, use mechanical handling devices to get blocks into position. Where this is not possible, make use of stevedores, rollers, bars, and good sound scaffolding. Rebuild block handling is extremely hard on fingers and toes and has great potential for strains and hernias. Great care and the proper manpower must be used in all block handling. As the brick work progresses, the holding steel must be replaced and the jack bolts and tie rods tightened.

All supervision working a repair must be constantly on the alert to see that one crew does not start working over another. Brick,

bars, and pieces of steel left lying around can be a great hazard. These items have a tendency to suddenly fall to a lower level. When this happens there is danger of someone being struck and injured.

When a section of cap is being turned, there are usually a large number of men and a great amount of material on the cap form. There are tie rods and steel to be worked under and around. Men will be climbing onto and off the cap. Adequate ways to get on the cap must be installed. Men must be constantly on the alert not to bump the steel work or get their hands pinched between the bricks and steel work.

Some of the blocks taken out of the basin

wall will be replaced in the build back. Glass must be cleaned off these blocks so they can be placed back in the wall properly. The glass is usually cleaned off with a chipping hammer; men doing this work must wear protective equipment. There is danger of getting eyes injured, parts of the body cut, and toes and fingers mashed.

Personal protective equipment is just as important on the build back as it is on the tear-out. Supervision must see that as the job change the safety equipment changes. Remember that most of the brick handling hazards that existed on the tear-out exist on the build back.

IDEAS THAT WORKED IN THE GLASS AND CERAMICS INDUSTRY

By ALLEN D. DAVIS

Supervisor, Safety and Security, PPG Industries, Inc., Creighton, Pa.

A collection of creative ideas to provide and promote safety in the work environment. This presentation was originally accompanied by slides.

A former official of our company once posed the following rule of thumb: "Any company that can do five per cent better than its average competition in all departments will dominate the field, and any that does five per cent worse will go broke."

That may sound startling, and is probably not strictly true in all situations, but if you think about it seriously, he has a good, sound argument. We can talk about the pyramidal affect of each department doing its five per cent better, but let's stick to our own areas of responsibility and just see what could happen.

With the costs of medical services, drugs, hospitals, workmen's compensation, penalty wages, and all other side effect costs of accidents going sky high, any five per cent improvement we can accomplish amounts to a

considerable dollar savings. We in the safety function are no longer that necessary evil overhead department that drains off the profits of the production departments. The entry of the Federal government into the safety field suddenly projects the accident prevention job into a responsible managerial position with definite cost reduction responsibilities.

We think you can meet this responsibility and attain your five per cent improvement by searching for and cultivating creative accident prevention thinking on the part of all employees. The source of creative ideas for accident prevention is endless. The sweepers, the engineer, the office clerk, the glass cutter—every person in the plant can help if they are given the opportunity to contribute. The ideas that worked, which we will discuss,

are the result of creative thinking by many people, and we would like to share them with you. Some of these ideas may be old-hat to you. Some may not pertain to your situation. However, if any of these ideas stir your imagination enough to help you solve some problem, our efforts will not be in vain.

Everyone knows that you should never work from the top two steps of a stepladder. One safety man painted the two top steps red as a danger reminder.

The flat glass industry has always had a problem of transporting plates of glass from one place to another. The accepted method has been to stack the plates on an "A" rack, tie the glass with a rope, and then hope that the rope will hold and damage to the glass is minimal. An adjustable clamping device eliminates the need for large quantities of rope and safely clamps plates of different sizes during transportation and storage.

Do you remind your employees to buckle their seat belts when they leave your parking lot? An idea you might consider is an eye catching sign with a purposely misspelled word. To carry it one step further, as you round the turn, you are hit with another question which reemphasizes the "buckle-up" reminder.

It took one serious accident to spur the development of the safety devices on a table saw—a flashing light which is tied in with an audible buzzer. Both signals are activated when the start button is depressed. A time delay allows both signals to operate before the saw starts to run. In addition, a hinged plate mounted over the "off" switch enables the operator to shut off the power with his knee if both hands are in use or in case of emergency. To restart the saw, the "on" switch must be pushed. The warning signals are activated everytime the "on" switch is depressed.

If you use a safety scoreboard to inform your employees of the plant safety record, why not emphasize the fact that your employees are safer at work than at home? Our people in this plant have suffered *ten* disabling off-the-job injuries to *one* on-the-job injury during the first seven months of this year. This technique not only informs your people of the record to date but also blows

your own horn for your safety effort. Your people will notice—make no mistake. A very attractive, eye-catching safety scoreboard emphasizes the up-to-the-minute accident-free man-hours record of the facility. The figure is continuously updating itself, so there is always a new figure to attract your attention.

Do you have a need for instant signs or signs that are repeated at certain intervals? You might consider a window shade sign that is inexpensive, attractive, and can be conveniently rolled up until needed again. Mounting is inexpensive and it can be installed in almost any location or on any wall. Color combinations are varied and attractive. Mountings can be made permanent to be used for signs of different topics. When signs are rolled up, they keep clean and neat for the next display date.

If you do not use the National Safety Council *Family Safety* magazine as a part of your program, I suggest you consider it seriously. I use it as an off-the-job program and have used it for a number of years. Several years ago, I was asked by my manager what kind of reader interest could I report in order to justify a subscription of the magazine for every employee. I then decided to kill two birds with one stone; that is conduct a reader survey and expand the use of the magazine as the basis for a safety contest.

This is how it works.

Each quarter, I receive an advance copy of the magazine. I read the articles, prepare a simple true or false, multiple choice quiz, add a safety slogan apropos to the season, and turn it over to a printer. The printer prepares the card, inserts it into the center of the magazine, and mails the magazines to all employees homes. The quiz is completed by the family and mailed to my office. At the close of each quarterly contest, ten cards are drawn from a box and each winner is awarded 10,000 green stamps. All cards are kept for a year and drawing with a grand prize of a portable TV set, ten winners of 10,000 S & H green stamps and five winners of 5,000 green stamps. We average 45 per cent return of the quiz cards each quarter. Cost is approximately \$3 per year per employee family.

Plagiarism is not a dirty word in the safety business. Safety people have always been willing to pass on an idea, stolen or not. An attention-getting chart was developed from an article appearing in an edition of our G & C newsletter. The article expounds on the cost of accidents in word form. One of our people visualized this story in a graphic stack of blocks form and converted the story into an attractive poster for plant wide posting.

One of the most dangerous pieces of equipment in any factory is the guillotine. It is difficult to guard because of a special mastic which requires much of the table top area. The solution to guarding this equipment has been to move the operating handle far enough away from the blade so that the operator cannot reach both the handle and blade area at the same time. The operating handle is protected by a guard to prevent accidental activation of the mechanism. Adequate warning signs and caution color coding constantly remind the operator of the danger involved.

No one suspected that a simple sheet metal bending machine could cause serious injury to a man bending a piece of sheet metal. Needless to say, it did! On both ends of the machine are long handles which are pulled down to clamp the metal in place as the sheet is being bent to shape. As the operator was observing his bending work, the clamping handle sprung loose and struck him on the side of the head, causing a depressed skull fracture. To guard such a machine seemed impossible; however, a little ingenuity resulted in an elephant ear type guard which will prevent a recurrence of such an accident.

Everyone knows that it pays to advertise! Everyone knows that an advertisement must be attractive and impressive. Consider eye-catching displays of normally non-exciting information, certificates, and safety posters. Lists of Wise Owl Club, Turtle Club, disaster team, or safety award members, can be done in an attractive way. Safety certificates, either corporate or National Safety Council, if framed and spotlighted, catch the eye and almost demand employee attention.

If your shipping and receiving departments work with open-top trailers, one of your problems is the removal of the trailer

tarpaulin before work begins and replacement when the trailer is loaded. You might consider yellow metal catwalks paralleling the entire truck bay. When the trailer is spotted, the catwalks are handwinched into place against the trailer, providing a safe walkway at the correct height to safely remove and replace the heavy tarpaulins. When the job is completed, the catwalks are winched back against the walls and the trailer is removed.

Rapid transportation for fire personnel around large area plants is quite a problem. A handy little fire vehicle provides space for several people in addition to a limited amount of portable equipment.

If you have a disaster plan in your plant, you certainly must provide some means to transport disaster equipment to the emergency scene. A mobile emergency dolly can be easily pushed to the scene or it can be picked up by a fork truck if necessary. The cart is equipped with a variety of emergency supplies to handle the situation.

Several serious hand injuries occurred in our plant to platform truck operators who operated in confined storage and production areas. The saber type guard which was standard equipment of these trucks provided only partial protection for the operator's hand. One of our people suggested a disc guard which is welded to the end of the steering lever. Since we installed these discs, we have not experienced one hand injury to the operators of these trucks.

Flying cullet has always been a problem in the glass industry. A cullet hopper has been revised as a covered hopper with an additional protective screen behind the hopper for those whose aim is bad.

I'm sure every plant experiences problems of protecting pedestrians from the dangers of walking through doorways and into the path of fork trucks or even other people. Protective railings need not be ugly, always in the way, type devices. A simple railing prevents human collisions but still allows sufficient room for entering or exiting. Brightly identified simple barriers will protect people from fork truck traffic, prevent people from exiting through a door directly into the path of vehicles. A series of such barriers, one in front of each door, establishes a distinct aisleway

for pedestrians but still does not seal off the entire area with a solid fence line.

Hazardous vehicle route intersections demand brightly colored attention attracting markings and warnings. An example of such an intersection in an old plant vividly alerts all vehicle operators of the dangerous situation. Brightly colored elevator doors alert workers of the danger of such heavy doors closing on an arm or hand. The use of audiovisual alarm or warning systems can be invaluable to alert employees of dangerous areas, for example, a simultaneous flashing light-bell alarm system at an in-plant railroad crossing. The flashing red light signal, warning people of the danger of this switch gear, can be used in many places in the plant. Blind corners, four-way vehicle intersections, floor openings, indicators for machinery in operation, and sprinkler alarm additions are situations in which such signals can be used.

If you were a maintenance man required to work on top of a batch silo and, on occasion, had to climb in and out of the shafts covered by square lids, you would appreciate a six inch wide steel addition to the protective railing. Don't overlook the favorable psychological effect of this additional protection.

Are there any tobacco chewers in your plant? If you have any, I'll bet you have a problem with their spitting and/or disposal of their cuds in the corners of your stairwell landings. You might try this little trick: paint the corners white. You may be surprised how effective this idea will be. It seems that most tobacco chewers hesitate to mess up a nice white corner.

If there is a need for female office workers to pass through your plant, you might issue them a bright colored smock which not only protects their clothing but also makes them easily seen by equipment operators.

In many older plants, ancient methods of work are still in use, and the hazards of many years ago are also still there. For example, a batch bucket filled with batch materials must be lowered to a conveyor for transfer to the next operation. This raising and lowering process is done with an old clutch system which is operated with a long handle. To raise the bucket and to hold it in a raised

position for filling, the operator had to lift the handle and hold it in position until the bucket was filled. Since it is difficult for a man to hold the handle in the "up" position, the men solved the problem with a 2x4. When the bucket was to be lowered, they just kicked the 2x4 away and the handle would slam down with several inches of lateral movement. A newly devised guard enables the lever to be pinned in the "up" position and also eliminates the lateral movement of the handle when it drops to the bottom position.

If you have areas which might require additional sprinkler protection, you might consider a 1½ inch fire hose connection on the outside wall of a flammable materials vault. The line is connected to a sprinkler head inside the vault, and when the water hose is attached to this connection, the sprinkler head inside the vault distributes the spray to every corner of the vault.

Your maintenance hard hat program could take on a new meaning if you consider a color code system by maintenance crafts. In addition, I suggest spending a little more and personalize the effort by painting each man's name on the front of his hard hat. This can help put you on a first name basis with these people and in addition, you can quickly tell who owns the hard hat that is not being worn when it should be.

Wrist cuts involving tendons which never seem to return to 100 per cent efficiency prompted the development of a wrist protector, which was designed to hold the protective leather over the critical area of the wrist. A thumb loop prevents the cuff from riding up the arm and still enables gloves to be worn comfortably. The Velcro fastener allows for adjustment and holds the cuff securely in place.

Yankee ingenuity developed a fluorescent light fixture washing stand made from a scrap drum which was welded together and legs attached. A rubber hose protects the men from the sharp edges. It is portable and easily moved to any area where needed.

If you have fork trucks, you have the problem of fire equipment and water lines falling victim to collisions with fork trucks. In such traffic areas, sturdy guards are necessary to protect this vital equipment.

All fire equipment and stretcher stations must be identified so they can be readily seen from afar. I suggest you consider the use of fluorescent paint. It may cost a little more but it will brighten up your areas in addition to being very eye-catching.

Effective marking of overhead sprinkler lines in areas where fork lifts operate can save you a lot of grief if one is accidentally torn loose by a careless operator.

The storage of large, narrow boxes creates quite a problem. Utilize removable steel pipes as standards against which the awkward cases can lean. Poles can be removed or inserted as needed.

Wooden bulkheads are used to protect personnel from possible falling broken glass. Packs of large plates of heavy glass are stocked in this manner until removed for shipping. In addition to protecting personnel, the bulkheads also protect the glass from damage by men or machines.

Handling packs of large plates of glass can be quite hazardous to the floorman on the glass handling team. A heavy screen guard protects the floorman from falling glass, yet allows complete vision to effectively perform his job.

Do you provide adequate equipment for your overhead crane men to get out of their cabs in case of an emergency? You might consider placing a "Sky-Genie" and harness in each overhead crane cab in case of emergencies. Here is another overhead crane idea that has merit: a green light mounted on the crane cab ceiling and visible from the floor indicates that power is turned on in the crane. When the light is on, anyone below is alerted that the crane is in operation.

Signal lights which are turned on by the truck scale operator to indicate that a truck has been weighed and is ready to move on eliminated the need for the weighmaster to leave the scale house and wave the truck driver on.

Dead man limit switches are found in many operations in our industry. One such switch is mounted to a roller frame in a grinding and polishing area. A heavy sash cord, when bumped by a man, automatically stops the machine to prevent the man from going under the mechanism. Another simple

limit switch is designed to prevent damage to equipment. This switch was installed on a bucket conveyor to prevent the buckets from crashing into a metal railing.

A maintenance foreman devised a heavy steel tilt-table, operated by a hydraulic piston, which is kept in a vertical position when not in operation. A hinged prop is set in place to eliminate the danger of the table falling in case of hydraulic failure and when repairs are being made.

Batch house pits from a railroad unloading dock require service men to enter, climb down a ladder, cross the floor, and climb another ladder to perform maintenance and cleanup. A steel walkway with metal railings eliminated this climbing and allowed them to walk directly to their work area with necessary tools and equipment to perform their duties.

Attractive safety shoe displays can help to improve your safety shoe purchases. All available styles and prices are indicated on each sample shoe. The incorporation into this display of a safety shoe severely damaged in a lawn mower accident with no injury to the wearer is quite impressive and did influence several people to purchase and wear safety shoes.

Also included in this display is a photograph of an employee performing a nailing job who was saved from a serious eye injury when a flying nail struck his safety glasses dead center. Publicizing such accidents with photos of the actual persons involved are quite effective.

Another idea for an effective home-made sign is a cabinet with fluorescent lights built in behind a plate of frosted or sandblasted glass, creating an eye-catching background upon which commercially available adhesive letters can spell out your message. Numbers and dates can be changed daily, if necessary, with a minimum of work and at low cost.

Our purpose has been to show you a few ideas that have worked and are still working to help our safety people attain our goal of preventing all accidents. If more details of any of these ideas are desired, we will gladly share them with you. If you have some good ideas, we would like to know about them so that we can incorporate them in our programs.

Rubber and Plastics Sessions

LEGAL RESPONSIBILITY

By A. E. MAYES
Attorney, Armstrong Cork Co., Lancaster, Pa.

The Occupational Safety and Health Act of 1970 was signed into law on December 29, 1970. It became effective on April 28, 1971, when compliance officers were sent into the field to enforce its provisions. The passage of OSHA was foreshadowed by the Federal Coal Mine Health and Safety Act, which prior to its passage, was the subject of extensive hearings in Congress. It was the data compiled at the hearings on the Bill, relative to crippling injuries, diseases, and deaths in industry, that had a direct bearing on the passage of this legislation. The purpose of and policy of the Act, as stated in its preamble, is "to assure so far as possible every working man and woman in the Nation safe and healthful working conditions and to preserve our human resources."

A question arises as to whether your business is covered under the law. The jurisdictional test is whether the employer is engaged in interstate commerce. Utilizing this test, it has been estimated that the legislation covers some 57 million employees in 4.1 million establishments in the United States.

The Act encourages the states to assume responsibility for the enforcement of the law, and many states have revised or will revise their procedures to conform to the federal requirements, so the reach of the Act will be fairly well all-inclusive. Furthermore, most of the states have already signed agreements with OSHA under which they may continue to enforce their own existing occupational safety and health regulations.

The Act imposes two primary duties upon employers. First, the duty to provide employees with a place of employment free from recognized hazards; and secondly, to comply with the OSHA's standards that have been issued and that will be issued under the Act. To date, the standards that have been issued

are either national consensus standards or established Federal standards.

With respect to the standards, the Act specifies three procedures for their issuance. There is a procedure for "interim" standards, one for "permanent" standards, and one for "emergency temporary" standards. Briefly, the differences among the standards are as follows:

Interim Standards—The formal rule-making requirements do not apply to the issuance of these standards. These are the standards to be issued by the Secretary of Labor "as soon as practical," beginning with the effective date of the Act and ending two years thereafter. An interim standard may be a "national consensus standard" or an "established Federal standard," and the standards issued to date are of this type.

Permanent Standards—These are the 6(b) standards. In establishing permanent standards, the procedure is much more detailed. The Secretary of Labor initiates the process when he determines that the standard should be issued, modified, or revoked. This is done by the Secretary requesting recommendations of an Advisory Committee, whose composition is specified in Section 7 of the Act. Finally, a proposed rule is published, and interested persons may file written comments or objections and request a public hearing on the proposed rule. All of the procedures mentioned must be completed prior to the time of issuance of the new standard.

Emergency Temporary Standards—These standards are effective immediately upon publication, but only for a period of six months. It is contemplated that they will be issued by the Secretary where employees are exposed to grave dangers, or where new hazards expose employees to harm. Upon publication, the Secretary must immediately

utilize the rule-making procedure for the purpose of establishing a permanent standard.

Each employee, as well as the employer, has a duty to comply with the safety and health standards. There is, however, no provision for the assessment of penalties against an employee, although there would be grounds independent of the Act for disciplinary action by employers against any employee who violates the standards. Any action the Secretary might take against an employee who violates a standard would be conjecture on my part. Nevertheless, an employee does have a duty to comply with the requirements of this law.

In enforcing the standards and the general duty provisions of the Act, compliance investigators are authorized to enter factories where employees work without delay and at reasonable times and without any advance notice. A representative of the employer and of the employees may accompany the inspector on his tour of the plant. If there is no authorized employee representative, then the inspector may consult with a reasonable number of employees concerning health and safety matters.

Unlike any other piece of legislation I can think of, employees and their bargaining representatives are given a role in the enforcement process.

They may file complaints. Employees or their representatives may accompany the inspector on the tour of the factory. Additionally, employees may point out dangerous conditions to the inspector. And they may also request that an inspection be made of the employer's premises.

An employee may not be discriminated against or disciplined in any way for enforcing any right he may have under the Act, or for filing a complaint or for testifying in any proceeding. An employee who feels he has been discriminated against may, within 30 days, file a complaint with the Secretary of Labor. The Secretary will then investigate the employee's complaint, and if he feels it has merit an action will be brought in the United States District Court requesting appropriate relief for the employee. Irrespective of how the Secretary views the complaint, he

has a duty to notify the employee of the action taken within 90 days from the date he receives the complaint.

A problem that may arise is whether the employer must pay an employee for the time he is involved in the inspection. In unionized plants, you will want to review the terms of the collective bargaining agreement. Apart from the collective bargaining agreement, however, does the action of the employer in not paying an employee constitute discrimination against him? This question has not as yet been answered by the Secretary of Labor.

Another matter for consideration relates to the representative authorized by the employees who may accompany the compliance officer on his tour of the plant. Does this representative have to be an employee? The regulations seem to require this. However, in those instances where good cause is shown, such as the need for an industrial hygienist or a safety engineer, a non-employee may accompany the inspection tour.

Suppose the inspector finds a violation of a standard. In that case, the inspector will issue a written citation to the employer. The citation will describe the nature of the violation and notify the employer of the standard or provision of the Act alleged to have been violated. The citation will also fix a reasonable time to abate the violation. Further, a copy or copies of the citation must be posted by the employer at or near the place of the violation.

For minor violations, a notice may be issued to the employer in lieu of a citation. A *de minimis* violation, as referred to in the Act, is one that may be classified as a minor violation. But what is a minor violation? Well, the Act states that a *de minimis* violation is one which has "no direct or immediate relationship to safety or health." Undoubtedly, many questions will be raised, as citations are issued, as to whether the violation is minor in nature. I suspect there will be much litigation on the point, although the compliance officer's analysis of the facts surrounding the violation will be entitled considerable weight.

After an inspection in which a violation has been found, the Secretary will inform the employer of the proposed penalty, if any.

The employer has 15 working days in which to contest the citation or penalty. If the employer takes no action to contest the citation or proposed penalty within 15 days, then the citation and proposed penalty will become the final order of the Occupational Safety and Health Review Commission.

The Occupational Safety and Health Review Commission is comprised of three members who have been appointed by the President with the advice and consent of the Senate. The persons selected, according to the Act, must have the requisite training and experience to carry out the purposes of the Act. The term of each member will be six years, except initially.

A hearing examiner appointed by the Commission will handle hearings on contested citations. The prosecutor, who is the Secretary of Labor, will present its case against the employer, and the Commission, acting in the role of the judge, will decide whether the employer has violated the Act. Regrettably, it must be said that since the Commission is an arm of the government, its neutrality in deciding cases may be questioned from time to time.

The hearing examiner's decision will be the final report of the Commission, unless the employer requests that the decision be reviewed by the Commission. The procedure for hearing contested citations is not unlike the procedure currently employed by the National Labor Relations Board in cases of contested unfair labor practice charges.

The employer is given the further right to appeal from the Commission's order. Such an appeal is to the United States Circuit Court of Appeals. The order of the Court of Appeals may be reviewed by the Supreme Court of the United States upon further appeal.

Aside from the appeal procedure, the United States District Court is authorized to entertain petitions by the Secretary to restrain conditions in a plant where there is a danger of death, or serious physical harm. This enables prompt action by the Secretary to eliminate dangerous conditions within a factory by bypassing the normal enforcement procedures under the Act.

There are also record-keeping require-

ments of the Act with which employers must comply. Regulations have already been published on the types of records that must be maintained, and you will want to make certain your procedures for the maintenance of these records are in order. Detailed information on the record-keeping requirements can be obtained from the U. S. Department of Labor. Among the records to be kept in conformity with current regulations are those relating to work-related deaths, injuries and illnesses. Records of minor injuries requiring only first-aid treatment do not have to be maintained, unless there is a loss of consciousness, restriction of work or motion, or it involves the transfer of the employee to another job.

Employers also have the duty to post notices to inform employees of their rights under the Act. Those notices state the intent and coverage of the Act and detail generally the responsibility of employers and employees to maintain safe and healthful working conditions. A supply of these posters may be obtained from the Occupational Safety and Health Regional Offices in the area in which your plant or facility is located.

Although the Secretary of Labor is charged with the enforcement of the Act, it should also be noted that the Department of Health, Education, and Welfare has a function to perform. An institute has been established within H.E.W. to carry out research and educational programs, and the Institute may develop and recommend Occupational Safety and Health standards. One of the functions assigned to H.E.W. calls for it to prescribe regulations requiring employers to measure, record, and make reports on the exposure of employees to potentially toxic substances or harmful physical agents.

The Act is quite complete in its regulatory scheme. It not only regulates conditions that constitute a safety hazard, but it also regulates conditions that may be injurious to health.

The penalties are severe, and employers, both large and small, would do well to make an all-out effort to comply with the general duty to provide safe and healthful working conditions, as well as to comply with the safety and health standards. A fine of \$1,000 may

be assessed for any serious violation. Where there is a failure to correct a violation within the period permitted a penalty may be assessed for each day the violation continues. A willful or continuous violator may be fined \$10,000 for each violation.

The criteria that will be employed to determine what penalties should be assessed have not as yet been completely spelled out and published for general use. The Department of Labor has indicated, however, that the following factors will be taken into consideration in the assessment of penalties:

1. What is the probability that the injury or disease will occur?
2. What is the potential severity of the particular injury or disease that can be caused by the violation?
3. What is the extent to which the standard has been violated?
4. And, of course, other pertinent factors will be taken into consideration such as the size of the employer and the cooperation of

the employer in taking steps to eliminate the dangerous condition as quickly as possible.

You should also be aware that any employer who violates any standard, rule, or order, thereby causing death of an employee, is subject to a fine of not more than \$10,000 or by imprisonment up to six months, or both. Any conviction, after a first conviction, may bring about a fine of not more than \$20,000 or up to one year in prison, or both. I point out these penalties to emphasize that the law has teeth in it.

The Act will necessarily have a considerable impact upon employers generally. Along, I suspect, we will have court decisions interpreting the various provisions of the Act that are not clear at the present time. In the months and years ahead, I feel that we can expect to see enforcement action increasing to the tempo currently existing under the Civil Rights Act and other federal laws protecting employee rights.

MANAGEMENT ASSIGNMENT RESPONSIBILITY

By W. R. MILLER

Goodyear Tire and Rubber Co.

Implementation of OSHA must be achieved by the same method used to accomplish other goals in industry—that is, by delegating responsibility by management. First, someone must be delegated the responsibility of acquiring and interpreting safety and health standards. In my opinion, this individual must have not only a knowledge of health and safety, but must also have the ability to coordinate. Coordination skills are an absolute must, because of the large number of standards covering a variety of operations within a plant. There is also the problem of proper interpretation. This requires, in many instances, the involvement of legal counsel. The most effective way to get involvement and bring about the greatest efficiency is to assign applicable standards to the various disciplines—for example, engineering, main-

tenance, production, chemical processes, etc. Each discipline must inspect its area in relation to the standards.

Follow-up is a must to ascertain that each area or discipline accomplishes the assigned responsibility given by management through the safety and health representative. A thorough job of inspecting will not produce all of the potential hazards, but will uncover the most obvious ones. A thorough job will also produce many items that fall into the category of "housekeeping." Local management should be expected to correct these conditions without further direction from safety or top management.

However, many of the other items will require resource allocations, such as budgets, special skills, additional equipment, process changes, etc. These must be categorized in an

orderly fashion so that top management can examine, place priority, and establish meaningful time tables for correcting or complying with OSHA standards. This approach may also point up areas where a company desires to apply for a temporary or permanent variance, either on a company or industry basis. This requires the involvement of management at all levels.

The health or industrial hygiene portion of the Act will be the most difficult to administer. Techniques of monitoring the environment must be established. For most plants, this is something new, requiring new skills, equipment, and documentation techniques. Management must support special training for those designated to implement this portion of the Act. Management also has the responsibility of training all employees about the Act, company responsibility, employee responsibility, and how it plans to implement OSHA. It is not enough to announce that some new safety requirements will be placed in effect. Management is responsible to explain why.

Another very significant responsibility in implementing OSHA is the recordkeeping requirement. Management must be responsible for adequate time for keeping records in

accordance with federal requirements. All levels of management must recognize the significance of proper recording of illnesses and injuries. The conclusion drawn from the data can be no better than the data. Therefore, one of the most closely followed requirements should be that of recordkeeping.

Standards and standard development is the real basis of success of OSHA. Realizing the standards that have thus far been promulgated are from two sources—consensus standards and federal standards—management has the responsibility of assisting in the development of future standards to a much greater degree than in the past. These standards become part of the law which we are required to implement. Let's participate to increase their chances of being meaningful.

Many of your companies will be asked to participate in research projects in the industrial hygiene area. Consider it with the greatest of concern, because this is an opportunity to make another contribution. Keep in mind that this research is being done to develop a basis for establishing health standards which also become a part of the law. The more involvement and the more support coming from top management, the easier it will be to implement OSHA.

PROTECTIVE EQUIPMENT RESPONSIBILITY

By K. L. STEELE

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If you were not already familiar with the scope, basic requirements, and implications of the Occupational Health & Safety Act, I am sure you are beginning to understand that this is the most far-reaching and all-inclusive piece of safety legislation that we have ever seen in this country. Its overall impact has been compared to that of the Wagner Act and the more recently enacted Civil Rights Act.

And make no mistake about it! It is the law of the land, and we can expect that it will be enforced. Any manager or company that thinks otherwise is in for a rude awakening.

My assigned portion of this rather massive Act that deals with personal protective equipment. These standards were promulgated in Volume 36, No. 105 of the *Federal Register* for May 29 of this year under Subpart I, Sections 1910.132 through 1910.140, and appear on pages 10590 through 10593 of that issue. The opening is entitled "General Requirements":

"(a) Application. Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards, of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact."

In general, "personal protective equipment" is defined as something that is worn on

the person, as opposed to machine guards, fire alarms, warning lights, etc., which are also designed to protect individual employees. The specific section covering personal protective equipment under OSHA deals with providing protection for the eyes and face, respiratory system, head, and feet. There is also a set of specific requirements for electrical workers (Section 1910.137), and hearing protection is covered under Section 1910.95, Occupational Noise Exposure.

Eye and Face

The general requirements state that "protective eye and face equipment shall be required where there is a reasonable probability of injury that can be prevented by such equipment." Examples include operations that present the hazard of flying objects, glare, liquids, injurious radiation, or a combination of these hazards. It is the employer's responsibility to provide "suitable" equipment. The employee is required to use it. However, in the final analysis, the employer is held accountable for the employee's actions in this area. In other words, if an employee refuses to wear the prescribed equipment, the employer is expected to take appropriate action. The Act says that employees shall use the personal protective equipment provided, but does not set up any particular penalty for failure to do so. There are, however, numerous substantial and specific penalties spelled out for employers who commit violations.

Specific minimum requirements for items of eye and face protection include:

1. They shall provide adequate protection against the particular hazards for which they are designed.

2. They shall be reasonably comfortable when worn under the designated conditions.

3. They shall fit snugly and shall not unduly interfere with the movements of the wearer.
4. They shall be durable.
5. They shall be capable of being disinfected.
6. They shall be easily cleanable.
7. Protectors should be kept clean and in good repair.

For individuals who require corrective lenses, safety spectacles are available which incorporate their individual prescriptions. (Non-corrective spectacles are referred to in the trade as "planos.") "Cover goggles," usually made of impact-resisting plastic and worn over streetwear type glasses, are also available, and may be used to meet this requirement. On certain jobs, plastic face shields in various sizes, thicknesses, and styles, with plain or tinted lenses, may be used to advantage. They are frequently worn in addition to or in conjunction with other types of eye protection.

Whatever type of eye protection device is chosen, it must meet the requirements of ANSI Standard No. Z87.1-1968, Occupational & Educational Eye & Face Protection. Copies of this and all other ANSI standards are available from: The American National Standards Institute, Inc., New York N. Y.

Respiratory Protection

As a general premise, OSHA requires that atmospheric contaminants or pollutants be eliminated at the source through "accepted engineering control measures" before you can resort to the wearing of personal protective equipment. Such measures include, but are not limited to, enclosure or confinement of the operation, general and/or local ventilation, and substitution of less toxic materials. Only if such controls are demonstrably impractical or not feasible is the use of personal protective equipment permitted.

As in the case of eye and face protection, the employer must provide "suitable" respi-

ratory protective equipment, and the employee must use it. In addition, the employer must "establish and maintain" a respiratory protective program* which shall include the following requirements as a minimum:

1. Written standard operating procedures governing the selection and use of respirators shall be established.
2. Respirators shall be selected on the basis of hazards to which the worker is exposed.
3. The user shall be instructed and trained in the proper use of respirators and their limitations.
4. Where practicable, the respirators should be assigned to individual workers for their exclusive use.
5. Respirators shall be regularly cleaned and disinfected. Those issued for the exclusive use of one worker should be cleaned after each day's use, or more often if necessary. Those used by more than one worker shall be thoroughly cleaned and disinfected after each use.
6. Respirators shall be stored in a convenient, clean, and sanitary location.
7. Respirators used routinely shall be inspected during cleaning. Worn or deteriorated parts shall be replaced. Respirators for emergency use such as self-contained devices shall be thoroughly inspected at least once a month and after each use.
8. Appropriate surveillance of work area conditions and degree of employee exposure or stress shall be maintained.
9. There shall be regular inspection and evaluation to determine the continued effectiveness of the program.
10. Persons should not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The local physician shall determine what health and physical conditions are pertinent. The respirator user's medical status should be reviewed periodically (for instance, annually).
11. Approved or accepted respirators shall be used when they are available. The respirator furnished shall provide adequate respiratory protection against the particular

*As used here, the word "respirator" includes gas masks and self-contained breathing apparatus as well as the particulate filter type.

to identify the various types through proper labeling and a color code. While all reputable manufacturers follow these procedures, the law requires the user to make sure that the canisters he purchases and issues are properly identified. These requirements are spelled out in detail in ANSI Standard No. K13.1-1967 - Identification of Gas Mask Canisters.

Head Protection

Industrial helmets must protect workers' heads from impact blows and/or penetration caused by falling tools or other objects and also from limited electrical shocks and burns (2,200 vac). They should be worn whenever there is a possibility of head injury resulting from bricks, tools, planks, or other objects being dropped from overhead. All such helmets must meet the requirements of ANSI Standard No. Z89.1-1969.

Foot Protection

Safety shoes are normally worn by tool and/or mold makers and repairmen, maintenance workers, storeroom personnel, shipping and receiving employees, or anyone whose work exposes them to possible foot injury. Safety shoes today are a far cry from the old "bull-nosed" designs. They are stylish, comfortable, and good-looking, and come in oxford, ankle, and boot lengths. They must conform to the requirements of ANSI Standard No. Z41.1-1967-Men's Safety-Toe Footwear.

Electrical Protective Devices

This section of the law covers rubber protective equipment for electrical workers and includes:

Item	Applicable ANSI Standard
Rubber insulating gloves	J6.6-1967
Rubber matting for use around electric apparatus (R1962)	J6.7-1935
Rubber insulating blankets	J6.4-1970
Rubber insulating hoods	J6.2-1950 (R1962)
Rubber insulating line hose	J6.1-1950 (R1965)
Rubber insulating sleeves	J6.5-1962

hazard for which it is designed in accordance with standards established by competent authorities.

All respirators must meet the requirements of ANSI Standard No. Z88.2-1969, National Standard Practices for Respiratory Protection.

In addition to the general program requirements outlined above, Section 1910.134 also specifies the quality of air and/or oxygen that may be used in self-contained breathing apparatus (oxygen is never used with an airline respirator), together with detailed requirements on compressors, air line fittings, cylinders, etc.

Standard procedures covering the use of respirators must be developed, and employees trained in their use. The type of respirator used for various jobs must be determined by a qualified individual. Written procedures must be prepared to cover the use of respirators in dangerous atmospheres and in certain circumstances at least one other person, trained and equipped for emergency rescue, must be present and able to communicate with the wearer of the respirator. If an airline respirator is used in atmospheres immediately hazardous to life, the wearer must also wear a safety line or harness.

Each employee who might have occasion to wear a respirator must be thoroughly trained in its use, care, and maintenance by a qualified individual, following the manufacturer's instructions. Fit is very important, and factors to be considered include beards, sideburns, absence of dentures, corrective glasses (temples), etc. Contact lenses are not permitted to be worn in contaminated atmospheres.

A maintenance program must be developed for all respiratory equipment, and must include regular inspection (including a check for leaks), cleaning and disinfecting, any necessary repairs, and storage.

The regulations also include detailed requirements covering inspection and storage of respirators used either routinely or for emergency purposes, and anyone who has this type of equipment in his plant should familiarize himself with these requirements.

Because all gas mask canisters look pretty much alike to the uninitiated, it is necessary

Hearing Protection

The law requires that, when industrial employees are subjected to noise levels in excess of those specified (90 dbA for eight hours to 115 dbA for 15 minutes or less—exposure to impulsive or impact noise should not exceed 140 dbA peak sound pressure level), personal protective equipment (ear "plugs" or "muffs") shall be provided and used to bring the sound levels down within the prescribed limits. As in the case of respiratory protection, however, this alternative may be used only if feasible engineering or administrative controls will not do the job.

In all cases where sound levels exceed those given in the regulations, "a continuing, effective hearing conservation program shall be administered."

At the present time, to my knowledge, there are no consensus standards or specifications covering personal noise attenuation devices.

Conclusion

There, as briefly as I can put it, you have a summary of the basic requirements of the 1970 Occupational Safety & Health Act as it pertains to personal protective equipment.

All of these requirements were effective on August 27 of this year, so, if you weren't aware of them before or if you did know about them but haven't done anything, I would strongly recommend that you get busy right away. A logical starting point would be to get a copy of the regulations (they are available from the Government Printing Office in Washington at 20 cents per copy) and study them carefully to determine just where and to what extent you and your company are affected. It will be too late when your receptionist calls some day and announces that the "Man From Uncle" is waiting to see you!

WHAT CAN THE RUBBER INDUSTRY DO TO IMPROVE ITS SAFETY PERFORMANCE?

By D. J. MARIANI

Safety Eng., Goodyear Tire & Rubber Co., Akron, Ohio

1. How do you catch his enthusiasm on fire? a. Wire his chair seat, heat his can. b. Can his seat and wire his chair. c. By your own enthusiastic example.

2. What motivates the industrious person? a. Give him challenging work in which he can assume responsibility. b. A new sports car. c. A ministered secretary.
3. Why do you do it if you do do it? a. You do pay your bills when due. b. Because you take action, find the cause, exert efforts and solve the problem. c. The dew is on the vine.
4. When do you expect to start your performance? a. The first time I have an audience. b. I've started. Thinking and planning. c. Just as soon as I get to the Play Boy Club.

To answer the question poised in the title, let's start off with a play on words. In slang usage, "canned" means "fired." We can go positive or negative from here. Positively, we may improve safety if our management and employees are fired with enthusiasm. If they are enthused about their efforts, then they shall succeed. The negative connotation refers to termination from one's position. Unfortunately, this may be true in order to achieve a safe performance. From top management down to the first line supervisor,

from the top production worker down to the man who merely clocks in, there may be apathy. It can and does occur. Weeding them out and obtaining a dismissal is a totally different game. Our main objective should be to fire these men with enthusiasm towards safety. Using another meaning for our word—we should get them off their cans. Charlie Schwab, a great leader of a past era said, "If they aren't fired with enthusiasm they should be fired with enthusiasm."

We will now answer question number one. We can check off the correct answer for number one as "C". If your answer was "A" you are an electrifying person. By channeling your own thoughts your enthusiasm will burst forth. If your answer was "B" you're the boss and fired the apathetic one with enthusiasm.

The next word we'll play with is industry. It is no surprise that the word industry is derived from industrious. Somewhat amazing, though, are some of the synonyms for industrious. Zealousness is one of these words, and it reflects enthusiasm. Where have we heard that? Sedulousness is but another, meaning hard working, diligent. Whether you are pushing for a safety program, planning a specific procedure, or attempting to motivate your fellow workers in safe practices, it takes hard work and diligence. Finally, assiduousness. Extract the first syllable and there's our word "can." A person who is assiduous gives careful and steady attention. All these words are descriptive of an industrious person dedicated to safety.

Let's check our second question. "A" is correct. "B" and "C" are motivators, but not necessarily in the direction we are discussing.

One of the shortest words, yet with probably more meanings than any other in our topic-question, is "do." We need only put to use some of this word's meaning to plot a course of improvement. Action. All the talking or listening won't help unless we take action. Finish. Once started see it through diligently. Cause. Exert. Solve. Need I go on? Another analogy can be made—whatever

you attempt, keep it simple. Remember the little word "do" and its meanings. Cover the magnitude of the project with short simple steps.

How did you make out on question three? No doubt about "B" being correct. "A" reflects a family motivated by their needs. Those with a bit of the grape in their thoughts may have answered "C".

Finally, let's discuss our reason for being here with another question. Is the key word in our topic "safety," or "performance?" The key is performance. Whether you talk production, quality control, procedure, or any other tangible measurable unit, if you get the performance that is expected, all the adjectives will be in line. One common error is saying, "production and safety." It should be "production with safety." Zero defects while helping production, should also show an improvement in safety. Check Webster or Merriam or Roget for performance. Many of the associated words have already been discussed. You'll also find a relationship between production and safety. Among the words are operation, production, action (here's one relative of safety) and accomplish (another relative). No "goos" or "ahs" please. Being in the rubber section I expect you to stretch your imagination. Now you can bemoan the antics with semantics.

How did you fare on number four? You may be a big ham if you selected "A". But this is an asset if used properly. You must train or sell or teach. These require some acting talents. Conceivably "C" might have the same connotation but perhaps more bare facts. You may groan aloud at that one. By your participation you automatically answered correctly number "B"—you've started.

In conclusion, let's review the main points we covered to acquire a workable answer to the question. "What can the rubber industry do to improve its safety performance?" We can state it with a sentence, a sentence you should repeat to yourself frequently: I am fired with enthusiasm and will work diligently toward motivating my fellow workers to obtain their objectives safely.

HEARING CONSERVATION—INDUSTRY'S RESPONSIBILITY

By JOSEPH SATALOFF, M. D.

and
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The effects of hearing loss can be as serious as the effects of head or eye injuries. But how do you convince top management that a noise control program is necessary? What do you do where noise control measures are not practical?

Recent Federal and Pennsylvania State regulations have speeded industry's efforts to protect employees from hearing loss due to excessive noise. The Occupational Safety and Health Act specifies that 90 dbA is the maximum noise level to which any employee should be exposed for eight hours daily over a period of many years. This is a realistic noise level at which to institute a hearing conservation program. It is not, however, a noise level intended for medical purposes or to be applied to individual cases. Much more reliable research is needed before specific guidelines for medical use can be established to relate hearing loss and noise exposure.

The new occupational safety and health law applies noise standards to every industry in the United States. Regulations notwithstanding, there are signs that management is developing fresh new attitudes that demonstrate real concern for the auditory capacity of its employees, whether they be chipper, weavers, or office personnel.

The Hearing Conservation Program

All regulations and legislation include the need for controlling noise at its source. When this is not possible, however, hearing conservation programs must be instituted. Modern industrial hearing conservation programs should be comprehensive, well planned, properly guided, humane efforts to determine the hearing status of all employees and to protect employees' hearing from being affected by environmental noise or disease.

Where noise control measures are not practical, ear protectors must be issued to

workers in noisy areas, and audiometric monitoring used to determine if the ear protectors are effective. Hearing testing also identifies employees with hearing problems unrelated to noise and, by referral to the employee's physician or to competent otologists, hearing in many instances can be restored.

In order to convince top management that a noise control program is necessary, they should be informed how serious a handicap hearing loss can be and what adverse effects it has upon an employee's life. A thoughtful, informed executive quickly realizes that management has much at stake in preventing hearing loss among its employees. Certainly the effects of hearing loss can be as serious as the effects of head or eye injuries. The industrialist has a special responsibility in this area because nerve deafness produced by habitual exposure to intense noise is irreversible. It is not curable. It is, however, almost completely preventable by an effective hearing conservation program.

Every industrial hearing conservation program has these essential aspects: analysis of noise exposure; control of noise exposure; measurement of hearing and audiogram interpretation; an effective hearing protection system, through ear protectors or other means.

Analysis of Noise Exposure

All plant work areas should have noise measurements taken by experienced personnel using approved and calibrated equipment. A general rule is that if noise is loud enough for employees to have to yell to one

another to be heard, or if they complain of the noise being far too loud, in all likelihood a hazardous noise level is present.

Control of Noise Exposure

Areas exceeding 90 dbA where personnel are exposed all day for many months should be delineated as "noise hazardous;" control measures should be instituted or ear protectors required. The preferred control of harmful noise levels is through engineering or administrative procedures. Realistically, in many noisy industries the cost of reducing operation noise is prohibitive. Gradually replacing noisy equipment takes many years. Reducing the number of hours of exposure to high noise levels is another method of control and is helpful during the period of machinery changeover and noise reduction efforts.

Hearing Protection

Ear protection programs are difficult to institute and even more difficult to sustain at effective levels. It is essential that management provide complete and active support for an ear protection program. Convincing management of this need is a formidable undertaking; they must be apprised of both the economics and the humane aspects of conservation of hearing.

It's an interesting side light that, in practically every effort to establish hearing conservation programs, union leaders have been extremely cooperative and appreciative of management's interest. This pattern refutes the fears sometimes expressed by management that starting a hearing conservation program might complicate labor relations and instigate medicolegal entanglements. On the contrary, if properly instituted, a hearing conservation program in every instance has brought labor and management closer together in the employees' interest.

The safety engineer or medical personnel responsible for the hearing conservation program must initially set up an educational plan that will motivate employees to wear ear protection equipment *before* this equipment is distributed. Movies, posters, and discussions, practically presented, will convince employees of the importance of wearing ear protectors in noisy areas and enlighten them

about the possible handicaps that may confront those who fail to use the protection provided. Workers must also learn how ear protectors are to be worn and cared for.

Continual reinforcement of ear protection programs is vital to their long-term success. The director of the program must set a high level, especially on a humane and medical basis, to provide the ear protection program with a proper foundation.

Management should not be astonished or indignant to find some initial resistance to wearing ear protection equipment. After all, similar reactions occurred during the introduction of head protection and eye protection programs. Management must recognize, for instance, that ear muffs are not always altogether comfortable on hot jobs or in very warm weather. If such circumstances exist, management should be ready to compromise on the continuous wearing of ear protection equipment. There are, of course, situations in which compromise would endanger workers' hearing; in such instances, ear protection must be made compulsory if all other efforts fail.

The most effective programs have been those that give the worker an option as to the type of ear protector he should use. It is unreasonable to insist that a worker wear muffs in a hot humid area in which maximum attenuation is not necessary. Ear plugs, glass wool, or molded protectors may be more acceptable. If it is an all-ear-muff or all-ear-plug program, a choice of type should still be offered. The best protection is one that is worn, and worn effectively.

Audiometry is one of the most essential and helpful components of a hearing conservation program. Hearing tests should be made prior to employment, during employment and, if possible, at termination of employment. Hearing measurements are comparatively useless if this vital information is not interpreted properly. A hearing testing program is, for all intents and purposes, of little value if the records are not read.

Audiogram Interpretation

Is the audiogram valid? There are medical folders in plant dispensaries in which at least 30 per cent of the audiograms are nei-

ther valid nor reliable. This could be due to tester or testee "mistakes." The toll is even higher if uncalibrated audiometers and unsatisfactory test environments are taken into account.

If a substantial hearing loss is uncovered in a new applicant, he should be referred (usually at his own expense) to his physician for a diagnosis and prognosis. People with conductive hearing loss can have their hearing improved by proper medical or surgical care. Employees already working should be urged to obtain proper care, and perhaps have their hearing restored so they can live better lives socially and vocationally. The serious psychological effect which deafness can have upon the personality makes it imperative for industry to concern itself with the prevention of all types of deafness, not only that caused by noise.

Though in many cases it takes a competent otologist to diagnose the cause of a hearing loss, it is advisable for the medical or hygiene department to have a working knowledge of how to differentiate roughly between conductive and sensorineural deafness. If the site of the damage causing the deafness is situated from the stapes footplate outward (the outer or middle ear), the hearing loss is called conductive. If the damage is inward from the stapes footplate, it is called sensorineural (nerve deafness). Conductive hearing loss is generally correctable; nerve deafness is rarely correctable.

Long exposure to excessive noise causes only nerve, not conductive, deafness, but noise is by no means the only cause of nerve deafness. Other common causes are congenital conditions; indiscriminate use of drugs such as dihydrostreptomycin, quinidine, neomycin, and kanamycin; head trauma (must be severe); explosions; viral infections; blood diseases; vascular spasms; Meniere's disease; and others. Any of these conditions can produce a hearing profile similar to that caused by long periods of exposure to intense noise.

The typical audiometric pattern of sensorineural deafness is a high frequency loss, but the same pattern can be found even in conductive hearing loss. For example, by merely placing a few drops of heavy oil in the external ear canal we get a similar audiometric

pattern, and yet this is obviously a conductive failure. It is apparent, then, that one cannot diagnose a hearing loss on the basis of the shape of the audiogram alone. It is necessary to refer the individual to an otologist for a diagnosis.

To cite one major reason for the need to obtain a diagnosis in certain individuals before they are hired: No matter what we determine to be satisfactory criteria for hiring personnel with nerve deafness, we should not hire applicants (especially for noisy jobs) who have a progressive type of nerve deafness. The presence of this deafness should be determined prior to employment. Detecting it in an employee long after he is hired obviously is too late; no matter what protective measures are used to guard his hearing, it continues to deteriorate. It is not always possible to diagnose a case as progressive nerve deafness, but competent otologists can do so in most instances.

Individuals with nerve deafness have not been shown to be more sensitive to further noise damage. We may feel free to hire such people if we bear the following concepts in mind:

1. We should be able to assure ourselves and the applicant that, if he uses adequate ear protection provided by the company, his hearing will not sustain any substantial additional damage due to the environmental noise at his job.
2. Legislation and regulations—local, state, and Federal—should protect the employer from liability for hearing loss which his company did not cause.
3. The applicant's hearing level should meet the demands of his job; he should not create a safety hazard as a result of impaired hearing, or as a result of excessive attenuation of hearing with ear protectors.
4. We must observe the proviso that the applicant's hearing loss should not be a progressive nerve deafness.

Two-Way Protection

There is no doubt that industry must continue to hire applicants with some degree of nerve deafness for noisy jobs, but every possible effort must be made to protect employees from high noise levels and the employer from

unwarranted liability. Only in such an atmosphere can a full and equitable solution to the problem be attained.

Pre-employment hearing testing also serves to protect the employer from unwarranted claims. But unless he has a valid and reliable measurement in his possession, he is likely to find himself on the losing side of the litigation process.

Humane efforts continue in the hearing testing program, with periodic examinations performed throughout the employee's term of employment. Annual retests are usually performed on all workers in critical noise areas. Here again, interpretation is important to determine meaningful changes in thresholds and to seek out the cause. This is an excellent way to determine also if hearing protectors are being worn properly, for there should be no changes in hearing due to plant noise if protectors are effectively worn.

Employees not in critical noise areas should be retested every two years. A natural question to raise here is, "Why should we test these employees?" The obvious answer, again, is that the philosophy of the program should be management's concern for all personnel. Hearing can change for reasons other than noise, and these changes should be iden-

tified. In any case, to single out only those employees exposed to noise is certain to bring accusations of employer self-interest and general uncooperativeness in the ear protection program.

An audiogram taken at termination of employment is a self-protection feature for management. Some states portion compensation payments to "previous employers," so it behooves these previous employers to know what hearing capability the worker had when he left.

As a final part of his responsibility, the employer should ascertain that the personnel performing audiometric examinations have been properly trained. It is likely that certification may become a requirement of most Federal and state regulations. Training programs for industrial audiometric technicians are held at various clinics. For instance, our clinic conducts courses almost twice a month for nurses and technicians. The follow-up to this training is to provide the proper audiometric equipment and test site for the trained individual to carry out his or her task. Experience has indicated that a frequent check on the output of audiometric technicians is necessary.

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Long Range Planning Committee—*L. W. BOULTON (Chairman), Safety and Plant Protection Supervisor, Polymer Corp., Sarnia, Ontario, Canada; *M. R. BATCHE, Corp. Mgr. of Safety, Firestone Tire & Rubber Co., Akron, Ohio; *S. A. WRIGHT, Mgr., Safety and Security, Inland Div., General Motors Corp., Dayton, Ohio; *N. R. HUNTER, Safety Engineer, Dunlop Tire & Rubber Corp., Buffalo, N.Y.; *G. H. BURKHARDT, Dir., Safety & Health, General Tire & Rubber Co., One General St., Akron, Ohio; *G. W. NICKEL, Manager of Safety, Armstrong Cork Co., Lancaster, Pa.

Nominating Committee—S. A. WRIGHT (Chairman), M. R. BATCHE, L. W. BOULTON,

Staff Representative—R. G. BELKNAP, National Safety Council, 425 N. Michigan Ave., Chicago, Ill. 60611

*Past General Chairman