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VOLUME 29 1953 TRANSACTIONS

Current Safety Topics in the

RUBBER INDUSTRY

as presented in sessions of the Rubber Section
at the 41st National Safety Congress

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New Approaches . . .

If safety is to keep pace with today's rapidly advancing technology, we must continually have "new approaches."

Each year, at the National Safety Congress, the ideas and experiences of many of the nation's top safety men are presented in the various sessions. Many of these ideas, devices and methods, first presented at a Congress session, later become generally accepted within their fields.

In order to present this information conveniently and at small cost, the Congress Transactions are published in volumes, one for each Section or Division, along with a General Sessions and Detailed Index to all volumes. The 35 volumes of the 1953 Congress Transactions are listed on the last page of this volume.

Safety directors everywhere have found the Congress Transactions a useful aid in their accident prevention programs. In industry, for example, their judicious distribution to key personnel in management and supervision has proved to be of invaluable service.

In preparing these Transactions, the proceedings of the Congress have been condensed and edited for reference purposes. Complete original manuscripts, with any charts or illustrations which were used, are available in National Safety Council files. Views expressed at the Congress or in this record are those of the Congress participants and are not necessarily those of the National Safety Council.

THE RUBBER SECTION

This volume is a record of the sessions held at the 1953 National Safety Congress by the Rubber Section. The conduct of these Congress sessions each year is only one of the many cooperative activities which the Rubber Section carries on in behalf of its members, and for the benefit of accident prevention work in the rubber industry generally. The Section gives guidance in the preparation of a great variety of technical and educational material useful in the day-to-day safety programs of rubber plants. The activities of the Section are under the direction of its Executive Committee, the members of which are listed at the close of this volume.

Rubber Industry Safety Data, 1952—Awards and Results—1952 Trends

By WILLIAM J. DOOLING

Safety Dir., Hood Rubber Div., The B. F. Goodrich Co., Watertown, Mass.;
Chairman, Statistical Committee

When injury rates are compiled in accordance with the standard method, they can contribute immeasurably to the success of safety work in many ways. The principal quality of such rates is that they can be compared one with another, a procedure which is important in measuring safety performance. One rate, even though compiled in accordance with the standard method, contributes little helpful information. For example, if a company had a frequency rate of 15.0, this still does not tell too much about the company's safety performance. True, it indicates the current rate at which disabling injuries are occurring, but it does not indicate whether that rate is good or bad, or whether it is getting better or worse.

However, if injury rates are available for other companies doing similar work, the rate of 15.0 assumes significance by comparison. And, if the previous year's rate for the company is available, or the rates for several previous years, then the rate of 15.0 assumes added significance by identifying the trend of injury experience.

Records of accidents are just as fundamental to efficient control of accidents as control over men, equipment and materials are for the efficiency in the operation of an industrial organization.

Interest in safety is created among supervisors when they are furnished with information about the injury records which are guideposts to them. Decreasing rates show that the safety program is producing results, while increasing rates indicate that something is wrong and requires investigation.

Accident records help to determine the major accident problems so that efforts may be directed where the largest reductions in injuries may be expected.

Statistics are also valuable for providing supervisors and safety committees with information about the most frequent unsafe practices and conditions so that they can utilize their time and efforts to the greatest advantage.

During the year 1952 there were 153 concerns in the Rubber Section Safety Contest. These contestants were divided into five Divisions in accordance with the average man-hours worked per month. The Divisions were as follows:

Division	Average Monthly Man Hours
Division I	(Over 400,000)
Division II	(200,001-400,000)
Division III	(50,001-100,000)
Division IV	(50,001-100,000)
Division V	(Under 50,000)

The injury frequency rates for 1952 reveal a reduction over 1951 of 12% for all Divisions. The frequency rate for 1952 was 5.08 for all Divisions as against 5.91 in 1951. However, the following indicates that Divisions I and IV had the best individual percentage decrease for 1952 over 1951:

	1952	Percentage from 1951
All Divisions	5.08	—12%
Division I	3.24	—21
Division II	6.19	—5
Division III	7.95	—3
Division IV	7.41	—32
Division V	12.12	+4

The average frequency rate for Division I was 3.24 for 1952. The three leaders in this Division were:

	Frequency Rate
Goodyear Tire and Rubber Co., England	.50
The Firestone Tire & Rubber Co., Akron, Ohio, Plant 2	.60
The Firestone Tire & Rubber Co., Akron, Ohio, Plant 1	.79

The average frequency rate for Division II was 6.19 for 1952. The three leaders in this Division were three B. F. Goodrich plants as follows:

	Frequency Rate
The B. F. Goodrich Co., Tuscaloosa Plant	.72
The B. F. Goodrich Co., Oaks Plant	.82
The B. F. Goodrich Co., Akron Aeronautical Div.	1.06

The average frequency rate for Division III was 7.95 for 1952. The three Safety leaders of this Division were the following:

	Frequency Rate
Electric Hose and Rubber Company, Wilmington, Delaware	.51
Humble Oil and Refining Co., Houston, Tex.	.62
U. S. Rubber Company, Milan Plant	.64

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53 National ct of these cooperative half of its work in the the preparatorial useful he activities mmittee, the

The average frequency rate for Division IV was 7.41 for 1952. In this group there were five top Safety leaders that were tied for top honors with perfect records. They are as follows:

	Frequency Rate
The B. F. Goodrich Chemical Co., Port Neches, Texas	.00
The B. F. Goodrich Chemical Co., Clarksville Plant	.00
U. S. Rubber Company, Naugatuck, Conn.	.00
The Firestone Tire & Rubber Co., Memphis-Flotation Gear	.00
Kentucky Synthetic Rubber Corp., Louisville, Kentucky	.00

The average frequency rate for Division V was 12.12 for 1952. There were 11 leaders tied for top honors with perfect records as follows:

	Frequency Rate
Goodyear Tire and Rubber Company, Quebec-Ind. Centre #3	.00
The Firestone Plastics Co., Pottstown, Pa.	.00
The Firestone Tire & Rubber Co., Christchurch, New Zealand	.00
The Firestone Tire & Rubber Co., Akron Research Lab.	.00
Armstrong Cork Co., South Gate, Calif.	.00
The B. F. Goodrich Co., DuBois Plant	.00
The Flintkote Co., Whippany Plant	.00
U. S. Rubber Company, Manchester Plant	.00
The Flintkote Co., of Canada Ltd., New Toronto Plant	.00
U. S. Rubber Co., Burlington Plant	.00
Fabric Fire Hose Co., Sub U. S. Rubber Co., Sandy Hook, Conn.	.00

Three types of awards for outstanding performance in industrial accident prevention are provided for in the "Plan for Recognizing Good Industrial Safety Records" adopted in January 1952 by the Industrial Conference and the Board of Directors of the National Safety Council.

The three types of awards are

1. The Award of Honor, the highest award, replaces the Distinguished Service to Safety Award. It goes to industrial establishments whose experience meets rigorous statistical standards, even though it may not be injury-free. It also goes to those which complete 3,000,000 man-hours without a disabling injury.

2. The Award of Merit has similar but less exacting requirements. The standards for non-perfect records are somewhat lower, and the minimum number of injury free man hours needed to qualify is 1,000,000.

3. The Certificate of Commendation is given only for no injury records covering a period of one or more entire calendar years and involving exposure of 200,000 to 1,000,000 man-hours.

For qualifying calendar-year experience all three types of awards are made automatically on the basis of annual records submitted to the Council by members. Award of Honor and the Award of Merit may also be made on special application in two types of cases:

1. Where a qualifying total of injury free man-hours is accumulated in some period other than a calendar year.

2. Where a current period of injury free man-hours is to be used in evaluating injury rate improvement.

Eight plants qualified for the Award of Honor, which is six per cent of the total reporting. This is considerably more than the corresponding percentage of 3.6 for all industries. Two of these Honor winners were for perfect records and six were on a comparison basis.

The names of the two companies that had perfect records are as follows:

Firestone Tire and Rubber Company, Akron Plant #2.

Goodyear Tire and Rubber Company, England Plant.

The other six winners of the Award of Honor on a par-comparison basis were as follows:

The B. F. Goodrich Co., Tuscaloosa, Ala. Plant.

Hood Rubber Company, a Division of B. F. Goodrich Company, Watertown, Mass.

Goodyear Tire and Rubber Company, Phenix City, Ala.

Firestone Tire and Rubber Company, Akron Plant.

Firestone Tire and Rubber Company, Memphis Plant.

Firestone Tire and Rubber Company, Akron Plants.

Perhaps a word of explanation is necessary about the two awards to all Firestone Akron plants and to their Akron Plant No. 2. The award to all Akron plants was a par-comparison award based on experience for the calendar year 1952. The award to Akron Plant No. 2 was for a no-injury period terminating in 1953, only a few months before this study was undertaken.

There were 21 Awards of Merit, 10 for perfect records, and nine on the comparison basis. For all industries, the percentage of Award of Merit winners was

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six per cent, which, on 150 units, would figure to about eight awards.

There were four Certificates of Commendation for 1952. The theoretical number based on the all-industry percentage would have been four or five.

It might be of interest to know how the average frequency rates compare for the first six months of 1953 with the total average of each Division for 1952:

	Year 1952	1st 6 Months 1953	
All Divisions	5.08	4.54	11%
Division I	3.24	3.05	6
Division II	6.19	4.80	21
Division III	7.95	6.74	15
Division IV	7.41	9.05	22
Division V	12.12	11.34	25

It would appear that the rubber industry in all Divisions except Division IV will show a definite improvement when figures are totalled up for this current year.

For the first six months of 1953, the various divisions each had industrial plants that were free from any disabling injuries

Division I

U. S. Rubber Company, Mishawaka Plant

Division II

The Firestone Tire and Rubber Company, Des Moines, Iowa

The B. F. Goodrich Company, Oak Plant.

Division III

Goodyear Tire and Rubber Company, So. Africa

Division IV

The B. F. Goodrich Company, Cadillac Plant

U. S. Rubber Co., Naugatuck, Conn.

Kentucky Synthetic Rubber Corp., Louisville, Ky.

Vulcanized Rubber and Plastics Co., Morrisville, Pa.

The Tile-Tex Div. of The Flintkote Co., Chicago Heights, Ill.

World Bestos Corp., Div. Firestone Tire and Rubber Co., New Castle, Ind.

Goodyear Tire and Rubber Co., Quebec-Ind. Center #5.

Goodyear Tire and Rubber Co., Reclaim.

Division V

U. S. Rubber Co., General Labs., Research Dept., Passaic.

McCreary Tire and Rubber Co., Indiana, Pa.

The B. F. Goodrich Co., Research Center.

The Firestone Plastics Co., Pottstown, Pa.

Firestone Tire and Rubber Co., Xylos Rubber Co of Calif.

The Firestone Tire and Rubber Co., Christchurch, New Zealand.

The B. F. Goodrich Co., DuBois Plant University of Akron, Akron, Ohio.

United States Rubber Co., Div. of Naugatuck Chemical, Baton Rouge, La.

General Shoe Corp., Nashville, Tenn.

Canadian Lastex Limited, Montreal, Que., Canada.

U. S. Rubber Reclaiming Co., Inc., Cheektowaga, N. Y.

U. S. Rubber Co., Burlington Plant.

The Firestone Tire and Rubber Co., Akron Retread Shop.

Fabric Fire Hose Company, Sandy Hook, Conn.

According to statistics from *Accident Facts* (I would like to recommend its use and it should be read by all companies), reveals that the Rubber industry stands in 10th place for both Frequency and Severity Rates, and well above the standing of all industries, a performance we all can take pride in.

The all industry rates and rubber rates are as follows:

All Industries	1951	1952
Free Rates	9.06	8.40
Severity Rates	.97	.88
Rubber Industry		
Free Rates	5.91	5.96
Severity Rates	.36	.42

In conclusion all indications point to 1953 being a year that will at least equal or better the 1952 records if the trend continues with so many perfect records in all divisions as it has been for the first six months.

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What Are We Doing to Prevent Windup and Let-Off Accidents?

(A Symposium)

Production Presents Their Side of the Story

By THOMAS J. CAIN, JR.

Director of Safety, The B. F. Goodrich Company, Akron, Ohio

My assignment is to outline briefly some of the background of this important rubber industry safety problem—the prevention of windup and let-off accidents. Certainly the problem is not new by any means. Seven years ago (1946) our National Safety Council Rubber Section devoted half of the afternoon session to emphasizing the problem and its seriousness in fractured arms and legs, chest injuries and fatalities. At that time Walter L. Schneider, then safety engineer for our company, and recently retired, led the discussion presenting a series of slides illustrating the lack of standardization in equipment.

From a production point of view, this lack of uniformity in design is our big stumbling block. Even within any one company, and for that matter within departments in the same plant, there is almost a total lack of standardization—be it chucks, shell bars, spacing of rolls, braking or lack of it.

This situation certainly doesn't lend itself to *Standard Operating Procedure* for production employees.

In 1947, growing out of our National Safety Council program in Chicago, Rubber Section Chairman Stanley Wright of Inland

Mfg. Div.-G.M., Dayton, held a meeting in Akron to which we invited the designers for this type of equipment. At this meeting came a great deal of agreement that many times we could rate rolls to avoid pinch points, use closure guards, eliminate center rolls, the rolls as high as possible, provide control against fabric wrinkles and in safety generally.

In the two years following, our Section Engineering Committee assembled additional information on equipment, as injury reports and in 1952 a Data D-RU3 was distributed by National Council.

Production employees must be educated and reminded constantly that windup and let-off equipment is really hazardous.

Unfortunately we can not use, for practical production angle, interlocked closures on much of this equipment.

This statement of the problem has been condensed to allow just as much time as possible for the experts here to contribute, striving to provide accident prevention how to lick windup and let-off accident their extremely high severity.

The Engineer's Approach to Safer Windups

By R. F. SNYDER

Electrical Eng., The Goodyear Tire and Rubber Co., Akron, Ohio

In spite of mechanical guards installed on equipment where it is not necessary for operators to come in close proximity to the particular area of danger, there still remain many locations where the production man must place his hands near potential danger spots. An example of this is the well-known calendar roll where occasionally the operator's hands come dangerously near the bite. Then there is the case where the tension roll

area is dangerous during the threading operation, or an innocent-looking idle may be a killer merely from an operator losing his balance.

Mechanical guards when not completely effective may be more dangerous than a guarded hazard because the danger is visibly apparent. Many serious and fatal accidents have been the result of caught between a moving roll, or belt,

Windup

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Following, our Rubber
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on equipment as well
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mechanical guard. On the other hand, few accidents occur on jobs where a mis-move would cause instant death because the occupants of the area realize the severe consequence. I know of several air compressors whose horizontal belts are guarded front and top so that they appear safe while concealing the ugly hazard behind them. Yet if a man, in order to steady himself, would lay his hand, palm down, on this guard, his fingers would extend beyond and under the guard and would be pulled between the belt and pulley.

In my present assignment I am concerned primarily with the case where mechanical guards cannot be used or where the ultimate reward for their use is questionable. Our aim is to make the safety automatic, fail safe, tamper proof and dependable, and at reasonable cost. The automatic objective is justified from the standpoint that many a man has been seriously injured because the hand-operated safety was on his right side, and his right hand was caught and he could not reach the safety with his left hand. Furthermore, the average mental reaction time required to trip a safety can easily be the deciding factor between a minor and a fatal accident.

The science of electronics can be applied to correct many of these difficult situations. A few standard commercial devices are available but most of those investigated by us fail to meet the rigid requirements previously set forth. Excepting the common electric eye in its simplest form, we have found no satisfactory commercially available electronic safety device. So far it has been necessary for us to either completely design and build our own electronic equipment or make changes in standard circuits to make them worthy of adoption.

To an electric eye, a piece of stock looks the same as a man's hand and for this reason, their use is very limited for calendar and windup applications. We have carefully investigated the possibility of using miniature radar similar to that used for traffic regulation but find that it, too, has severe limitations. The electric eye so-called "Curtain of Light" seems to have pretty general application where the presence of productive materials do not give false operation.

One of the most unique automatic type of safeties is one in which the mere approach of a man's hand will actuate the safety.

This device can be applied in any application where the danger roll can be electrically insulated from the surrounding structures. We call this a proximity safety because it operates merely by the approach of any part of the body near the roll.

A small radio-frequency transmitter is used with the danger roll connected as an antenna. The close approach of a man's hand disturbs the radiation pattern and trips the safety. We have designed and built several of these devices. Our latest one is designed so that a failure of power or any tube or other component, will trip the safety thus making it completely fail safe.

An automatic safety is difficult to apply to windups because the danger point moves outward with the buildup. In order to be effective, it must trip by the insertion of a limb as small as the tip of the fingers.

Two methods can be used to meet these stringent requirements. The first is in operation on one of our so-called clover-leaf windups. This consists of two photoelectric cells mounted on a miniature carriage and guided by two rails. A bank of small lamps and an optical system provides a parallel light beam across the fabric to the photocells. The shadow of the fabric buildup on the lower photocell causes the carriage to move upward by a small servo motor.

Since the second photocell is only one inch above the motion controlling cell, the upper cell always sees the light of a beam that is within one inch of the fabric regardless of the diameter of the roll. A hand laid on top of the fabric or a hand caught in the bite, will intercept the light beam to the upper cell which automatically stops the calendar.

The second type of automatic safety for this application is a combination of electronics and mechanics. This consists of a light-weight, counter-balanced idler roll that rolls on the buildup from an empty shell to the full roll. This idler is supported by pivoted side arms to which an electric potentiometer is attached. The potentiometer is connected to a specially designed small electronic control unit which ignores the slow gradual movement of the roll buildup.

However, if even a finger passes between the idler roll and the fabric, or is caught between the fabric and the buildup, the idler roll will be moved upward at a very fast rate of travel. The electronic circuit differ-

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entiates between the slow buildup and this sudden movement and trips the safety.

Of course, in some cases neither of these devices prevent the man from being caught but they both have such a fast and automatic response, that they will protect against a serious injury. We are now working on an electric eye model that will provide a light beam and eye that will follow the danger side of the bite area during buildup. This model will stop the calendar if a hand gets in the danger area, and thus will prevent the accident.

A few words about the engineer's assistance in a safety program might be in order.

Many of our windup safety projects have been difficult merely because of the peculiar mechanics of the machine. This applies mainly to old machines with high inertia drives, which makes quick stopping difficult, or, to old handwheel clutches that require turning of the handwheel to stop the windup.

Some of these hazards have existed for years because no one had an effective solution.

An engineer with a good imagination usually find a simple solution to the problems. We have recently solved a very knotty problem of long standing by inserting an air cylinder and piston in with an operating bar or shipper cable operated valve instantly reverse action of the piston and retracts it which quickly stops the machine and valve is reset by hand. Failure of a sure will also render the machine inoperative.

My final admonition to the safety engineer is to take an electronic engineer and a mechanical engineer to the problem and examine the machine from all angles. They know that you and their families are depending on them to save their lives and loved ones, and you can be assured that your confidence in them will be richly rewarded with safer machines.

Mechanical Guards Have Their Place

By N. H. RINEHART

Mechanical Eng., U. S. Rubber Co., New York City

I. General

A. Did you ever see a preacher entangled in a wind-up or let-off unit? No—because clergymen are never near such equipment.

B. Accordingly, the most effective way to avoid accidents is to keep everyone away from critical rolls and "pinch points."

C. This can be accomplished by the following methods of minimizing exposure to accidents and specific illustrations will be shown later.

Methods of Minimizing Exposure to Accidents

1. Eliminate some personnel and exposure to accidents by using automatic and semi-automatic equipment. This method will not only save lives but will greatly decrease costs. Management will be gratified and your safety departments will become stronger.

2. Completely isolate the wind-up and let-off units with electrically interlocked sectional fences, cages and safety mats.

3. Completely enclose critical rolls with "removable-disconnect" type guards.

4. Arrange critical rolls and pinch points such that they are shielded by other machine parts.

5. Use "disconnect-nip" guards.

6. Use pneumatic safety feeds.

7. Locate safety bars and cables in clear areas.

8. Avoid falling rolls of fabric from accidentally-opened chucks by positive type engaging devices or "catch cradles."

The above methods will now be illustrated.

1. The first method is to minimize personnel and exposure to accidents by installing automatic and semi-automatic equipment.

One such piece of equipment is the Benson Automatic Roll Changing Wind-up Fabric.

This unit automatically cuts fabric and starts it on a new roll at speeds up to

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m to save their limbs,
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anging Wind-up for

ally cuts fabric and
at speeds up to 600

feet per minute without stopping or chang-
ing the speed of the process line.

The fabric passes over the large friction
winding roll and on to the package being
wound up. The empty shell is in its start-
ing position on top of the fabric and fric-
tion winding roll. The splicers are in posi-
tion against the empty shell to help carry
the new end of fabric around the shell. The
splicers are nothing more than three small
pulleys in triangular formation with a nar-
row belt passing over all three pulleys. One
side of the triangular belt hugs the empty
shell.

The air operated gate knife, which is usu-
ally serrated, moves upward, cutting the
fabric and forcing it against the empty
shell and into the nip of the triangular belts
and the shell. These belts or splicers in turn
guide the free end of the fabric into the
nip between the fabric on the friction wind-
ing roll and the shell. Thus the roll is
started and while it is winding, the com-
pleted roll on the far side of the machine
is released on to a conveyor, truck or hoist
by pulling the lever on the side arms. A
new shell and shaft are pushed into position
by forcing two hardened, spring loaded
rollers apart at each end of the shaft. These
rollers then close in around the shaft jour-
nals and hold the shaft in position until they
are released by the lever on the side arms.
This unit costs approximately \$3,500.

Another automatic type of winder is the
*Dilts Automatic Roll Changing Wind-up
for Paper and Plastics.*

This unit will automatically cut and start
new rolls of paper and plastics at speeds up
to 1,000 ft. per minute without slowing
down or stopping.

As the roll of plastic at the top is near-
ing completion, it and the empty shell (at
bottom) are swung approximately 90 de-
grees counter clockwise. Two idler rolls
are moved into contact with the empty shell
by means of pneumatic cylinders. This
causes the plastic to have about 180 degrees
of wrap on both the top idler and the
empty shell. The shell is propelled at one
end by speeder, A belt. A pneumatically
operated knife similar in shape to approxi-
mately 70 degrees of the shell circumfer-
ence cuts the plastic and guides it around
the shell and hence starts the new roll. The
completed roll is then released and a new
shell inserted in its place. Both shells

are then swung 90 degrees counter clock-
wise into the normal winding position after
the idler rolls are retracted from the newly
started roll. This unit costs approximately
\$31,000.

*Semi-automatic roll changing wind-up for
plastics.*

This is a continuous winding unit with
which the shells can be (but not always
are) fed automatically and the finished rolls
dropped on to a wrapping table. However,
the cut and start of a new roll is made by
hand.

2. *Completely isolate the wind-up and
let-off units with electrically interlocked
sectional fences, cages and safety mats.* This
application is a triple let-off unit which had
been responsible for two minor accidents.
In order to permit insertion and removal of
the let-off roll trucks and yet isolate the rolls
and pinch points during operations, vertical
slide gates were installed with interlocks.
The back or far side is guarded with "drive
enclosures" and interlocked swinging gates.
The coated fabric passes over two pull rolls
prior to traveling under the festoon dancer
roll and on to the take-away conveyor. Of
course, the festoon dancer moves between
a starting switch and a stopping switch. It
was the accidental bumping and movement
of this roll by the operator which started
the equipment and caused one of the in-
juries. The worker was entangled in the
nip of the roll just below the dancer.

When renewal of fabric rolls is necessary
the gate is raised and the limit switch at
the top shuts off the power. This permits
the service men to enter the enclosure and
work safely. When servicing is completed
the gate is lowered causing the switch to
close and again make power available for
operation of the equipment.

It may be observed that if it were not
for the "recora" safety mat anyone could
enter the enclosure and close the gate and
thus make the equipment operatable with
the person inside the enclosure and danger
zone. However, when he stands on the
safety mat the power is again disconnected.
These safety mats are advertised in your
safety magazines. At present we do not
have the safety mats within the enclosure.

This important method of affecting safety
was practiced at the Detroit plant of the
United States Rubber Company through

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efforts of the safety organization, and the manager and assistant manager of the plant.

3. Fully enclosing critical rolls and nips with removable-disconnect type of guards.

Not all rolls have danger points and it is only necessary to guard the more critical ones. The guards are interlocked so that the machine will not operate when they are not in place. The guard is swung back into the non-operating position in order to permit threading and adjustment of the fabric. The interlock is open and workers can safely work on the critical roll.

4. Arranging critical rolls and pinch points so that they are shielded by other machine parts.

A slitter and rewind unit is designed so that all of the real danger points are barred by other machine parts. The two top rolls of material are turning in such direction as to place their nips at inaccessible locations. The platen or friction winding roll forming nips with the two top rolls is covered by these two rolls. The nip roll is isolated by the front top roll. The slitter knives are barred by the platen, nip and two top rolls. The two idler rolls are not dangerous as they are contacted only by the web and not backed by solid rolls. In case of human contact the web will give or tear. *This is considered an economical and effective type of design for safety. Its principles should be used often.*

5. Using disconnect type of nip guards.

A pivoted two-way guard covers the nip between a web and a roll. In case of entrance between the guard and the roll the actuating member will move to the left and in case entry is between the guard and the web the actuator will move to the right. Movement in either direction will actuate the disconnect switch.

There are three possible points of entry and three corresponding movements of the trip bars. (1) Hand over bar—the safety trips down. (2) Hand through bars—safety trips up. (3) Hand under bars—safety trips up.

6. Employing pneumatic safety guards and feeds.

This method uses an air stream to push the free end of a web on to a traveling roll or belt which in turn carries it into the bite. Of course, the air stream is directed at such an angle as to help carry the web forward

into the bite but its main function is to keep it snug to the moving roll or belt. It is important to have the forward end feed table split the air stream so that half of it is on the end of the feed and half on the moving roll or belt. As soon as the web enters the nip the air is shut off. The air pipe and any support members it may have act as rigid guides for the nip. The air is preferably controlled by a foot valve. This application was demonstrated through the offices of A. Dery, Ratz, Lambton and Pierce of Dominion Rubber Co., Canadian subsidiaries.

7. Locating safety bars and cable so as to give easy accessibility in critical areas.

8. Avoiding danger of falling rolls of fabric from accidentally opened chucks by using positive cam type engaging devices or cradles.

A near accident was caused by a collar freeing itself from a conveyor spring catch and sliding back to the position where the chuck was open and the mandrel with a heavy roll of belting fell approximately six feet to the floor. As a corrective measure, Nelson Longee of U. S. Rubber Co.'s Passaic Plant affected a track on the periphery of the chuck and an attendant cam follower. The cam was located in such a position as to engage the open "V" shape track to engage it when the chuck opening is in an upward position. Thus the chuck collar cannot retract and open the chuck when the mandrel would be in a position to permit the mandrel to fall. Other variations of tracks and followers were made by Longee but time does not permit discussing them.

The "segmental collars" or "catch cradles" immediately beneath the chucks will prevent the mandrel from falling when the chuck is open. There have been cases where the roll was stopped, the chuck open and in an upward position and while a hoist or conveyance was being adjusted the mandrel would turn to the downward position, causing the roll to fall. These "segmental collars" will catch the mandrel and prevent it from falling. The development of these and other safety features at Passaic was furthered by H. W. Willard, plant manager.

9. Spacing of let-off snuffer rolls with a minimum of six inches between their peripheries.

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It may be noted that the minimum dis-
tance between the surfaces of these five hold
back or snuffer rolls is six inches. It was
believed that this would allow the passing of
a human hand between rolls without excessive
injury, if any. In case others have more or
different information on this, we would be
pleased to discuss it with them.

10. Use of center type wind-ups instead of the surface type winder

A dangerous type of nip is afforded by
the solid friction winding roll and the heavy
fabric roll (1,000#). It is difficult to place
nip guards on such units without being in
the operator's way during roll changes. One
unit is favored with a constant winding
tension but automatic tension control units
now afford the center type winder with a
constant winding tension. In the operator's
position there is not any exposure to nips.
Also the nips on the side opposite the oper-

ator are not of the solid and dangerous type.
One side of the web is free for expansion in
case of a "caught hand or limb." The center
type causes less adhesion between plys and
provides rounder rolls.

11. Wire wind-ups.

It is regretted that time is not available
for the winding of wire as this can be some-
what hazardous.

12. Designing for safety.

Mechanical engineering societies, publi-
cations, and so forth, are constantly pro-
moting safety in the design of new equip-
ment. Several of the features listed are
important and it may be possible to cover
them during the discussion period at the
end of the program.

In concluding I would again like to ask:
Did you ever see a preacher entangled in a
wind-up or let-off unit?

Lights Out: Something Different in Safety Presentation

By J. L. GUIHER and I. F. SHEPARD

Supervisional Training Div., The Goodyear Tire and Rubber Co., Akron, Ohio

(Editor's Note: To assist readers in the
interpretation of this safety presentation,
directions and content are published as given
by authors.)

Tape Recording:

Gentlemen: It all depends on you. What
do you know about your eyes? Did you
ever give much thought as to just what
your eyes mean to you? Let me illustrate as
simply as possible just what I mean. Will
each of you gentlemen close your eyes for
just one minute and I'll tell you when the
minute is up. Thanks, gentlemen, just hold
it and remain in darkness for 60 seconds.
(One minute of silence)

All right. That was one minute of dark-
ness. How long did that minute seem to
you? I hear you answer. I never thought
a minute could be so long. That's what
your eyes mean to you. Take them away
for just one minute, and that minute seems
like an hour. Yet, I read somewhere that
there are 107,000 totally blind people in our
country. People living in perpetual darkness.
One moment of carelessness—one quick
slip of the hand—(bang—lights out)—
results in a lifetime of perpetual darkness.

I repeat, over 100,000 Americans are totally
blind, living in perpetual darkness.

J. L. Guiher: Yes! It can happen to you.
Blindness is not confined to any race, creed,
or color. It can happen to anyone.

It happened one hundred and forty years
ago to a little French boy. At the age of
three, he was playing with a pointed instru-
ment and some leather scraps in his father's
harness shop. He held a piece of leather to
his eye and struck backward with the
pointed tool. He punched himself into total
blindness.

Some 20 years later, working with an-
other pointed tool, he pricked thousands of
dots into cardboard and paper. This time
he punched himself into immortality.

That blind young man was Louis Braille,
whose last name, uncapitalized, is a part of
a language of every nation. The touch
system which he developed permits the blind
to read and write and is among humanity's
greatest boons to blindness. (Uncover flannel
board)

Braille signs like these are probably not
important to you, but they are to those who
are blind. A casual glance won't cover the

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job. No, it has become necessary to feel out each letter—each word for the rest of their lives. Never again will they enjoy the wonderful experience of seeing a sunrise, because for them, the sun has set forever. Their home life! Their job! How can they answer the innocent question of their son who on Sunday morning asks his daddy to read the funnies. How about that job that they have to give up because they can no longer handle it. Their dreams and their hopes have all vanished into darkness.

Yes! Blindness is a pretty stiff price to pay for a few minutes of carelessness. Yet, you risk it every day, every time you are too busy to put on safety glasses. In fact every time you disobey any safety sign.

Wake up! Stop this needless waste of such a precious gift as *eye sight*.

Protect your sight while you still have the opportunity—after the accident has happened, it is too late.

Remember, it can happen to you! (Place flannel board cards—"It Can Happen To You.")

I. F. Shepard: But it doesn't have to happen to you. We were born with eye protection. Our eyes are placed in the safest and most useful location, back in the bony structure of the skull. They lie in a bed of fat which gives them great mobility and protects them from pressure. In addition there are other natural guards for the eyes—namely, the eyelids, eyelashes and tear glands.

Consider what a perfect job the Creator has done in the protection of your eyes.

The Good Lord certainly never meant that we human beings would be so foolish as to expose our eyes to the hazards of industry without man-made protection for them. And so, we must use a little of this

thing called common sense, and protect eyes of industry by providing maximum eye protection. Over 100,000 of your Americans are totally blind.

More than 400,000 are blind in one eye. And every year about 20,000 more lose sight of an eye.

Eye injuries to the working man—loss of sight cases and temporarily disabled cases, cost about \$10,000,000 a year; cause the working man to lose about 10 million working days. Worse by far in many cases, careless injuries cost precious eyesight which, through proper protection might have been saved.

You begin to get a fair idea of the perfection of man in the protection of his eyes.

I think you will agree that the simplest and easiest way to improve this and conserve the eyesight of our people is simply to protect everybody's eyes. Let it be an objective of your organization must decide that eye injuries are unnecessary. You must decide that you will prevent eye injuries from now on, and embark on a program of 100 per cent eye protection.

You are the men who can put this program across successfully. To you I commit this responsibility. Indeed, it is a great undertaking in a field of serious consequence.

If you will decide that *every person* working for you will have maximum eye protection, then our problem of preventing eye injuries is settled. In plain language, eye injuries will stop, and this new type of injury will be removed from your responsibility. It all depends on you. Your sight while you still can see. Remember, don't let it be "Lights Out" for you!

Synthetic Rubber

(Round Table Discussion)

Presiding: F. T. REYNOLDS, Personnel and Safety Dir., Government Laboratory, Univ. of Akron, Akron, Ohio

Conference Recorder: EARL GARDNER, The Goodyear Rubber Reserve Corp., Akron,

Eye Protection

Howard W. Cable of Kentucky Synthetic Rubber says that they have a complete eye protection program and at the present time

have four Wise Owl members, the last of whom is a welder who caught a piece of slag in the center of his safety glasses. He raised his welding hood with the s

sense, and protect the providing man-made 100 of your fellow blind.

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members, the latest of o caught a piece of s safety glasses when ood with the safety

glasses underneath. They feel that they certainly saved an eye there and they have had three similar cases. They say that they have saved thousands of dollars by their program.

They present awards right in the plant when they have an accident and it creates a great deal of interest.

They pay the entire cost of the eye program except that they do not pay for eye examinations and the employee pays the cost of special lenses.

Fred Sands of the U. S. Rubber Company in New York said that his company has 100 per cent eye protection, a portion of which is paid for by the company. R. R. Johnson of the Richardson Company, Melburn Park, Illinois, has had 100 per cent eye protection at one time. However, this has lagged somewhat and they are in the process now of getting back to 100 per cent.

Mr. Utley of Firestone Synthetic Plant at Lake Charles said that they do not have 100 per cent. Mr. Miller of Gates Rubber Company in Denver said they do not have 100 per cent, but furnish goggles wherever needed on specific jobs. All of the companies do have an eye protection program of some kind with two companies having 100 per cent.

Mr. Cable makes the statement that the program in his plant has paid for itself many times in the eyes saved through the wearing of safety glasses and that it has become a program where the employees as well as management are for it 100 per cent.

The question was brought up by Mr. Johnson as to what type of glasses are being used and it was agreed that for general protection, the regular acetate frame is used, but for specific hazards, special types of goggles are issued.

Mr. Cable brought out the fact that the fitting of glasses is very important to have the employee wear glasses all the time. It was agreed by the group that the program should be a selling one rather than one of forcing employees to wear eye protection.

Mr. Reynolds brought out the fact that care must be taken in choosing the right type of frame for use in industrial plants, inasmuch as some types are not approved for industrial use and do not give the proper amount of protection.

Safety Training New Personnel

Mr. Utley of Lake Charles says that people in his plant are given an indoctrination talk by the safety director for an hour or an hour and a half during which they are told of the safety rules of the plant in general and those pertaining to their particular job and are then turned over to the foreman who instructs them and again stresses the safety rules.

Mr. Cable stated that the procedure in his plant is quite similar. The new worker is given a safety manual and the manual completely covered by the safety director, after which he is issued his safety equipment which consists of glasses, hard hat and safety shoes.

Mr. Johnson said that the procedure in his plant is again quite similar and in addition, the foreman has a check-off list, which he must cover in talking to the new man, which includes all of the safety aspects of the new employee's job.

Vessel Entry Procedure

It was agreed that all vessels which have contained any hydrocarbons should be filled with water and boiled rather than steaming only. It was brought out here that in one of the synthetic plants a static spark had occurred from condensate forming on the top of the tank due to interrupted steaming. The boiling is in addition to the standard procedure of blanking all lines, locking out switches, and so on, which is a normal procedure in all plants.

Fire Prevention

The next subject discussed was hot and cold work permits which all of the plants use; the permits being issued by either the fire department or the fire and safety department.

Fire brigade training was the next subject discussed. It was found through discussion that cooperation of the employees in serving on the fire brigades is excellent in all of the plants represented. Also discussed in this regard was the subject of alarm systems, the testing of the fire and gas escape alarms and the frequency of having fire brigade drills and all-out plant drills. Mr. Cable brought out that, in his plant, rules are set

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up so that only those people who are vital to the emergency such as fire brigade members and operators, are at the scene and all others are to stay clear. This procedure was agreed upon 100 per cent by the group.

Housekeeping

It was found that most all of the plants had a regular housekeeping and safety inspection program of some kind during which all departments were inspected.

New Problems in the Tire Plant

(Round Table Discussion)

Presiding: H. L. ANDREWS, Safety Dir., The Firestone Tire and Rubber Co., Pottstown, Pa.

Conference Recorder: J. L. DEAN, Safety Dir., The Firestone Tire and Rubber Co., Memphis, Tenn.

The subject of continuous run-buttons is being brought up. It is one of the extreme hazards in the rubber industry. These continuous run-buttons are those on the semi-automatic machines, not on the automatic machines. As a man was gumboring the tie he got pulled into the machine. What can be done to eliminate this particular feature of the operation?

It has been suggested by Mr. Cross of Firestone to continue with the old foot pedal where your machine stops when the foot is taken off the pedal. A moving foot pedal is what has been suggested so that the man can use a foot pedal and still be doing some other operations; but when he takes his foot off the pedal, the machine stops.

It was pointed out that a safety was put under some of the heavy duty machines to eliminate the possibility of the man getting pulled by the drum.

Spinner Bars

This is a bar that puts on plies on a big tire building machine. One points out that they blow them on with air. This brings up a number of hazards, also. The bar is attached immediately in a series of short rollers. The bar is operated by a spring being attached to the machine and the man does not have to hold it and make it possible for the bar to fly back and hit him.

One of the U. S. Plants puts a tread on this which is already spliced and this can cause considerable trouble with the bar flying back and hitting the man in the head. Other companies just run the tread on by a continuous-run method.

There is no standard way of putting on

treads or using roller bars or putting on plies.

It seems that there was no direct solution as to how to eliminate the man working with a prodder bar or a roller bar other than constant supervision, very thorough training and follow up work on safety instruction.

(B. F. Goodrich is talking about a bar which looks something like a crank, similar to that of a prodder bar. It eliminates a lot of hazards of a prodder bar. It is still in the experimental stage. The drum rotates when he uses this which eliminates, as we say, a considerable number of hazards.) The advantage to these crank-type bars is that they do not throw a man.

Bagomatics

This new type of equipment was brought out by Mr. Cross of Firestone. There was a discussion as to what kind of accident problems are being caused by it. Mr. Lynch of Firestone described one of the types of accidents he was having. One of the points brought up was that one of the operators of the Bagomatic machines would lay the tire in one mold; then go over and lay a tire in another mold, then come back, as the machine was going down on the first mold, to lay the serial. This created an extreme hazard.

This definitely calls for a training program and should be eliminated. The operator should lay the tire in one mold and lay the serial and then push the button to close the mold.

On the Bagomatics, when the mold was in process and the safety was hit, the mold

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would go back up no matter where the safety was hit. A new installation was put in whereby when the safety was hit, the mold would immediately stop and the lid would not continue to reverse itself and go back up.

Mr. Turner of Goodyear pointed out that when the bag is about to blow in a mold, they put in a strain safety so they will know when the bag is going to blow. This would stop the mold from opening. Knowing that there was still pressure in the bag, it was dangerous to open the mold because the bag would continue to blow. A safety installation was put on a post several feet away from the mold which was a remote switch; when the operator was called away from the mold, this switch was used to open the mold in order to get the tire out. The bag would blow. Since no one was close to the mold, no one would get hurt.

Mr. Croushore of Armstrong has some new Bagomatic machines. He doesn't have any particular trouble with them. He pointed out that the new type of installation where the bottom half of the mold is at floor level would make a much easier handling problem.

Mr. Frame of Goodyear asked a question on how to prevent accidents when molds and housings on the molds break. The only safety that he has on it is a safety block. It was pointed out that the new McNeil molds are counterweighted so the molds cannot fall. On the old type which he is speaking of, the mold can drop out of the top half of the mold. When the transmission housing breaks, the mold will roll and drop. He wants to know what safety devices can be used. He uses a safety block which allows a man enough time to get out of the mold before the top falls.

Mr. Cross of Firestone pointed out the way the safeties at the Firestone plant work. When the mold opens entirely, a pipe-type safety falls in line over the cylinder which holds the molds up and the man has to pull a lever to close the mold when he wants to shut the mold.

The Goodyear man from Toronto pointed out that he had a safety on the back of the mold which was a form of notches. When the mold would drop the safety would fall into the notch, eliminating the possibility of the mold continuing to fall.

Getting the employee to use the safety block is important. It is a matter of con-

tinuous supervision, continuous safety instructions, and pointing out the importance of the safety features to be used.

Mr. Kumpel of the union felt that it should be a rule that every man should be required to use this block for his own protection, that it should even be put into negotiations.

Mr. Carson of U. S. Rubber wanted to know what methods other plants were following for cleaning the molds.

Several of the plants make minor repairs and also clean the mold while the mold is in the jacket. The mold has a safety lock and a red tag is put on the switch before cleaning of the mold is started. No cleaning operator gets into a mold until it is certain that the safeties are locked in place, with the result that the mold can be effectively and safely cleaned by leaving the mold in the jacket. It would be quite an item to be required to take the mold out of the jacket every time it needed cleaning.

It is suggested that all manufacturers check with the McNeil mold manufacturer to see if they can work out some uniform safety that could be used which would be effective while making minor repairs and cleaning the mold.

Post Cementing

After material has gone through the calender and then is spread with a post cement, there is considerable fire and explosive hazard. Much has been done. Further discussion was requested on preventive measures to eliminate the possibility of serious injury.

An accident occurred several years ago where the fans stopped in a particular post cementing unit. The fabric continued to be dipped and it accumulated considerable fumes close to the fabric. When an employee came up to touch the fabric, a static spark caused a fire. This has been corrected so that when the fans in the unit stop that is, the ventilating unit, this automatically stops the whole calender unit. There has been a very strict regulation in installation of these particular units in that they are all approved and authorized by the insurance companies and everything is in accordance with them, eliminating the possibility of an explosion or a fire. There are also automatic extinguishers in these units so that there doesn't even have to be a fire, but a certain temperature will set off these fire extinguishing units.

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Reclaim Keeps Up with the Times

(Round Table Discussion)

Presiding: M. R. BATCHE, Safety Dir., Nylos Rubber Co., Akron, Ohio

Conference Recorder: H. J. BALDWIN, Industrial Relations Dept., Midwest Rubber Reing Co., East St. Louis, Ill.

Eye Protection

No company had a strict enforcement program. One company will replace safety lenses at no cost to the employee. One company will pay \$5.00 toward the cost of new or replacement safety glasses. One company will pay \$2.50 towards the cost of new glasses and will replace lenses in case of lost-time accident. One other company will replace only in case of injury. They find fitting the glasses to employees is one of their toughest problems. This should be studied by all companies.

Toe Protection

We find the shoes cost \$8.00 to \$10.00 a pair. All companies have no compulsory programs. Two companies have programs not compulsory, one company sells by mail order through their personnel offices and gives the employees some discount. Two companies sell through an employees' store at retail or factory cost. One company takes a 25 cent loss on each pair sold. One of these companies also gives safety shoes as safety prizes and attempts to keep safety shoes on the employees, 100 per cent. On the average, in all companies, about 60 per cent of all employees are wearing safety shoes.

Fire Protection

One company reports all fires (in their last year), and their cost has been approximately \$295. One other company reported four fires, two due to burning with a torch, and one a fire in an oven. One other company reports two fires, one in a machine due to spontaneous combustion, and one due to welding. One other company reports numerous small fires. All four companies have fire brigades and one company now is setting up a fire proving ground. The majority of our companies, due to the catastrophe at General Motors, are studying the problem in a very detailed manner. Two of these companies have had demonstrations by a fire department to show their supervision how to handle equipment.

Injuries

Two companies analyze the type of injuries and two companies do not. It analysis by type of injury will be companies and supervision. All four companies hold monthly meetings for supervision and the management toward the meetings is reported as good. In one company the vice-president all top management attend; in one company the president and the plant manager one company, the factory manager and superintendent will attend and in one company the division superintendent. The company feels they are by-passed. In one of these companies, in case of a lost accident, the foreman must report the to the plant manager in complete within 24 days after its happening.

On new new equipment, inspection safety department before installation reported by one company and that all guards must be placed on it before it in operation, or, within a certain period other company relies upon the manufacturer. Two other companies are informal this, but their superintendent and engineering department will provide safety protection after the equipment is installed. It noted, in particular, that one company two safeties on each mill. One safety kick with your knees and the other a safety bar. This is different and will be checked into further.

Safety Contests

Two companies report they do have contests. Two companies report none. with the contest report remarkable and they also wish to note that all fire cases do not enter into this picture as being against a man who has entered the test, or, as points against them. Their feeling is that the important thing is to have a contact and discuss it between employee and supervision. All in all, this group feels that it has learned something from the round table and wishes to have more of them.

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alyze the type of injuries do not. It is felt injury will help allision. All four committees for their management attitude is reported as very the vice-president and tend; in one company: plant manager; in every manager and plant end and in one committee. This last one is by-passed. In one case of a lost time must report the injury in complete detail is happening.

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t they do have safety es report none. Those t remarkable success note that all first aid this picture as count- has entered the contest them. Their feeling is to promote it between employees all, this group feels something from the round e more of them.

Mechanical Goods Makes Big Strides

(Round Table Discussion)

Presiding: N. C. LONGEE, Safety Dir., U. S. Rubber Co., Passaic, N. J.

Conference Recorder: ARTHUR R. POMEROY, Safety Dir., Ohio Rubber Co., Willoughby, Ohio

The following questions were brought up by members attending this panel:

- 1 Extrusion and vulcanizers — concerning safe installation.
- 2 Comments on guarding punch presses and trim operations such as on small molded goods.

Mr. Dooling brought up the problem of multiple deck presses sticking and how the men can be prevented from jumping the gun in going into these presses to unload, not realizing that the top deck has stuck closed, and it would fall on to the operator's hands.

Another problem brought up was in relation to lifting, referring to manual operations, how the men may be instructed, the controls, and various laws that are in effect in different states concerning the load which a man or a woman is allowed to lift.

Other problems posed included monorail systems in tubing divisions and what could be done to prevent head injuries and getting the proper head clearance.

Another problem discussed was back strains, hernias, and the like, that occur in the press rows. The type of man that should be hired to do the job as far as physical qualifications are concerned.

Still another problem had to deal with hoists being used in press rows and molded goods plants and how they should be inspected and what can be done to prevent failures.

Another question brought up was late reporting of accidents which developed into infection cases. The last one was that of people who were injured by simply trying to work too fast in order that they may beat the rates in effect.

In answer to the question on extrusion and vulcanizers, Stanley Wright described the accident which occurred in Inland Rubber and the measures which were taken to prevent a recurrence of an accident similar to that. He offered, upon request, to send a print of the safety devices they have installed on horizontal vulcanizers in their Inland plant.

A summary of other comments made by members at the table would be that these

vulcanizers must be so guarded that you are not able to get steam pressure into the vessel until such time as the door is completely locked and in position. You should not be able to open this door until all steam pressure is out of the vessel.

In answer to the question of how to guard punch presses and prevent accidents when trimming small molded goods, there were a great many comments made by a number of the members at this committee meeting which could be generalized in the following words: that you should, wherever possible, so design and guard your machine that it would not be able to repeat, even if it smashed the machine rather than repeating.

A guard should be used, wherever possible, that comes closed before the press actuates. Wherever possible, it is practical to use a double switch where the operator must have both hands on the buttons before the press would actuate or close.

It was also suggested that the real solution to this problem is going to come when we can so design our punch presses, dies, and like machinery so that the operator will not have to place this hand between the dies in positioning the piece which is being trimmed.

In answer to the question by Mr. Dooling of what could be done to prevent multiple deck presses sticking, the top deck falling and crushing the hand of the press operator, Mr. Pomeroy suggested a solution which is being used at the Ohio Rubber. He offered to send prints and photographs of the curtain which the engineers designed and which we feel will do away with this particular hazard.

The last question which we had time to discuss was the problem of inspection of hoists in the press box. Mr. Longee explained that they have one man responsible in their plant for this inspection. He uses a tag system. He is very familiar with the different types of hoists which are made and the possible weaknesses with each hoist. By his experience, he is able to do a very good job in keeping their hoists in good repair. This is a full-time job for him.

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