

**1961**

**National  
Safety  
Congress  
Transactions**

**VOL. 12**

**INDUSTRIAL  
SAFETY**



**NATIONAL SAFETY COUNCIL**  
425 North Michigan Avenue  
Chicago 11, Illinois

SCF-ALLF-02096

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## INTEGRATING ACCIDENT PREVENTION WITH PRODUCTION

By THOMAS A. SULLIVAN  
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We would like to offer the experience of our Granite City plant as a case study in the integration of accident prevention with production.

We have tried to present facts to you and not draw conclusions. If these facts can give you clues as to steps you can take in your own plants to tie accident prevention into your production processes this is the most that we believe can come from such a study. We would be the last to claim we have discovered any panacea for the complex subject of plant safety.

This case study is interesting because it was a new plant in a new area for A. O. Smith Corp. The exposure volume is significant, about 3,000,000 manhours per year.

From the beginning we had a safety director, who is still there. He is a staff man and must get all action through the operating people.

At the start-up of the plant two problems developed which complicated our problem immediately:

Certain automatic assembly equipment was not ready when product deliveries had to be made.

Our competitors were not ready to produce at all so we had to carry the entire requirements of our customer for the first few months of our operation.

As you might suspect, this required the hiring of green workers and green supervisors and made the training problem almost insurmountable at the beginning.

We have tried to put our whole story on this chart. It looks complicated but if you will follow along with me we will take it one step at a time.

The chart is divided into four areas:

The accident frequency data.

Production demands and union relationships.

Management action.

Safety and housekeeping.

Accident and frequency data show the number of lost time accidents per month since the plant began production in Sept. 1954. You will note that we have identified injuries to maintenance men separately from production people as the nature of their exposure is different and may be of some significance. For example, in 1959 and 1960 every other accident was in maintenance, although the hours of exposure of the production people is 10 times that of the maintenance men.

The frequency rate is a 12 month running average.

Production demands and union relationships are grouped together as things over which the management of the plant did not have complete control.

The start-up of new models in the summer of each year should have an adverse effect on safety because new equipment is present and men are back from a layoff of 4 to 6 weeks and presumably "out of practice." An examination of the chart does not disclose such a trend. Rather the accidents seem to bunch up in the later months when the heat is on to produce at peak efficiency. However, the data is not conclusive here either.

The effect of union activity on safety, while at first appearing adverse—after the union certification in 1955—does not show any discernable pattern. The accidents occurring after the major work stoppages in 1956 and 1957 do not seem to be related to the stoppage any more than to the model changes which occurred shortly thereafter.

In fact, it looks as though the formation of the Union-Management Safety Committee in 1959 had a major favorable effect on accident frequency. The frequency rate for the two year period since April 1959 is 0.78 per million manhours of exposure.

Management actions—There were four manufacturing superintendents during the period on the chart—identified as A, B, C and D. The frequency rate for each was: A—3.47; B—1.20; C—3.15 and D—1.53.

follow rules, it is impractical to expect that workers will comply.

Generally speaking—any rule that can withstand an honest appraisal of its worth is enforceable and is worthy of respect. The comments made concerning some of the shortcomings of safety rules are intended to point up some of the general areas of fault that contribute to workers having a lack of respect for them. Consequently, if you are finding a general disregard for your plant's rules—may I suggest that you take a hard look at them to see if you find similar symptoms of weakness.

Another important thing is to acquaint employees with the nature of the rules they are required to observe, in short, these guides to action must be sufficiently publicized to make them part of the "working knowledge" of every employee.

While the educational approach will lead to the observance by a large segment of the work force, unfortunately, there is always a small minority that will insist upon violating rules. Thus, where education fails, supervision must be prepared to take proper disciplinary action.

I believe that the following statement—made by Emile F. du Pont of the Du Pont Company—sums up the whole story concerning enforcement of safety rules.

"We believe strongly in the philosophy of preventive safety rather than after-the-fact correction. We place great stress upon safety violations rather than upon injuries as such. We are tough toward willful violators, as we are more interested in eliminating the chance for injury by working safely without violations of good practice than in setting records. Where we are reasonable but firm on violations, a safety consciousness is gradually developed among the entire work force."

This brings us to the all important problem of enforcement and discipline. If rules are to be enforced they must—as has been said before—be clear and known by the employees. They must be fair and undiscriminatory—and they must be uniformly applied—otherwise you may find them contested by union representatives.

The need for acceptance of safety rules by union representatives is mentioned because under the terms of some labor-management contracts a company may find that improper rules can become a basis for the

filing of a grievance—or even arbitration. Two examples will illustrate this point.

A union local in Trenton, New Jersey, filed a grievance against management's newly inaugurated rule which required 100 per cent compliance with an eye protection program. The following statement is taken directly from a report that the union local made to its membership concerning the outcome of action taken on the grievance:

"The 100% eye protection program—the union argued that many areas in the plant did not require safety glasses. Management has agreed and have modified their program accordingly. The areas and jobs not required to wear glasses are—purchased parts cribs, receiving docks, salvage building, main stock crib, overhead crane operators, steel bay area, yard area, parts checker, tool room aisles, waste material disposal operations, car washing activity and drivers not working in production areas."

"Management's unilateral promulgation of a safety rule presents an arbitrable grievance."

On a question brought against a company by the Oil, Chemical and Atomic Workers' Union an arbitrator said, "The company had issued a regulation, which the union challenged, requiring all employees to wear hard hats and toe guards. The company argued that it had the unquestioned unilateral right to establish reasonable safety regulations—such as those being challenged. The union contended that safety regulations involving special protective devices, which employees were required to wear, constituted conditions of employment for which the union had been recognized as the sole and exclusive bargaining agent. The union held that these were matters for joint consultation between the parties in the first instance and subject to review in the grievance procedure in the event that a job was described and classified in a manner with which the union did not agree. The arbitrator held that although the employer ordinarily has the right to determine for itself rules for protection of employees, there are circumstances in which the union may challenge the imposition of certain types of rules as well as the reasonableness of particular rules and that the union's protest in these cases presented an arbitrable grievance under a contract which defined a grievance as any disagreement between the company and union involving interpretation or alleged violation of contract."

While I do not wish to invade the subject of discipline, there are a few precepts concerning discipline that also may have a bearing on the respect tendered to safety rules. Briefly they are:

*First:* Disciplinary action under some labor-management contracts may be subject to arbitration. When such is the case—remember that an arbitrator may determine whether there was just cause for the discipline, and also whether it was overly severe.

*Second:* The burden is usually yours to prove that your rulings are proper—and that the penalty given wasn't too severe.

*Third:* Discipline and discharge are serious matters. Consequently, be sure to have the answers to such questions as: "Did the employee know he was violating a rule?"—"Was his violation intentional?" and "Were previous violations condoned?"

*Fourth:* Discipline must be the same for bargaining and non-bargaining employees.

From the foregoing discussion, three basic principles emerge as being the basis for creating and maintaining respect for safety rules. They are:

1. The rules themselves must not be at fault.
2. Employees must be educated concerning the needs for the rules—and the benefits to

be derived from compliance with them.

3. When all else fails, enforcement and discipline must be resorted to, but on an equitable basis.

In summarizing this discussion, I would like to stress that:

*First*—Safety rules are essential to the attainment of both production and safety objectives.

*Second*—Ways must be found to make employees want to abide by safety rules.

*Third*—The rules must not be unreasonable or improper—for if they are they won't be respected or accepted by the workers—and without acceptance they are doomed to failure.

## THE CONSTRUCTIVE USE OF DISCIPLINE IN SAFETY VIOLATIONS

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On of the too many things aggravating the world situation today is the different interpretations applied to identical words by various persons or cultures. I want to consider the term, "constructive discipline," with a common and single interpretation of its meaning and implication.

*First*, let's look to Webster, who says,

"Construct (verb) 1. To put together the parts of something. To build. 2. To set in order mentally, to arrange.

"Discipline—1. Training (to train). 2. Punishment—(to punish). 3. Orderly Conduct. Synonyms are—educate, teach, chastise and correct."

*Second*, let's toss out these words and concepts: *punishment, to punish and chastise*. They have no place in our philosophy. We are not running penal institutions! We are operating business organizations where we are attempting to *instruct* our employees to perform their assigned duties to the best of their ability and with the least possible hazard to themselves and their co-workers.

*Third*, now, let's look at what we have left from Webster's definitions:

1. To put together the parts of something. To build.
2. To set in order mentally.
3. To arrange.
4. To train.
5. Orderly conduct.
6. Educate, teach and correct.

*Fourth*, from these concepts, let's construct our definition of "Constructive discipline"—to arrange by educating and correcting to motivate our employees to conduct themselves in an orderly fashion, both mentally and physically.

What this means is that we must strive to reach the minds of our employees and move them to conform to the standards of conduct as represented in the Ford Motor Co. safe practices rule books. This is not always an easy matter, for a man is not a simple organism, like some of the lower animals. A man can be very complex.

*He is what he has lived. He is what his ancestors have been.*

Keeping this in mind, we must consider that, just as no two individuals have identi-

cal fingerprints, so too, no two individuals have identical thinking processes. Because this is true, we must remain very flexible in handling this matter or discipline.

We must keep in mind that the old days when a "straw boss" kept order in his crew by developing the hardest knuckles, the biggest biceps and the loudest mouth, are long gone. Possibly a few cases of straw bosses also developing the widest toothless grins might have had something to do with this. Seriously, though, we do not believe that physical or severe mental or emotional force has any real place in today's application of corrective discipline to industrial employees.

The concept of discipline at the Ford Motor Co. is that it must be *corrective*. This concept also dictates that *only* as much corrective action be applied as is necessary to result in the desired correction. In other words, it is the expressed philosophy that all personal feelings be divorced from the case and only the *facts* are to be considered. This is what we mean by the term, "constructive discipline." Discipline that is *constructive* through reasonable and fair *correction*.

We do not mean to imply by what we have said up to this point that we do not want our supervisors to maintain control over their employees. To the contrary, it is insisted that they do. It is insisted that they be firm. Point No. 6 of the 14-point Ford Motor Co. Safety Program states, "Maintain firm plant discipline." Please distinguish between firm and harsh. These two words are poles apart in our philosophy.

As a matter of fact, if you think of it in the right light, being firm and insisting on strict adherence to the requirements of safety rules is actually being kind to an employee. Being kind to him to the extent that you force him to avoid having an accident. He may not appreciate your kindness in applying corrective discipline when it is merited. It is, nevertheless, kindness of the first water.

Speaking of the 14-point Ford Safety Program, points No. 4 and 5 are also worthy of note here. "Sell safety to the new employee," and "Re-sell safety repeatedly." It might appear that there is a discrepancy of terms here. Is there really a conflict

between "selling" an idea and using "discipline?" We think not. Remember what Webster says? Discipline is education. Selling, too, is education. Therefore, Selling is a form of discipline.

Regardless of what we call it, or how we define it, it means nothing unless it is applied.

I am reminded of a story I read sometime ago in a magazine. The story told of a rather large company that had been experiencing numerous serious accidents and injuries to employees with an ever-increasing frequency. According to the story, this went on for several years. (Hard to believe, but that is the story.) Numerous meetings to find causes and remedies were held but always wound up with someone saying that they hoped the "bad luck" would make a turn for the good, soon.

Finally it got to the point that someone at the top decided to bring the thing to a head. He called the managers of the various departments together and told them that it was up to them to find ways of controlling the situation or he would find someone who could. Rather drastic but a very effective form of discipline.

It turned out to be very constructive, as well. The top man's ultimatum finally made them realize that, far from their running the organization, the organization had actually been running them! Finally jolted out of their false sense of job security, each manager passed the jolt on to his subordinate supervisors. Each man was told to tender his resignation right then if he didn't think he could stop his employees from injuring themselves.

"Wow! The bosses are really mad now," they all thought, as they started scratching heads in search of ideas. It didn't take much scratching to come up with the idea of opening the safety rule books that for so many years had laid unopened in the desk drawers. One after another got the bright idea of starting to insist that the rules must be adhered to.

There were no changes in normal work procedures, no supervisors lost their jobs. The supervisors just started to supervise within the framework which already existed in the organization. The foreman started to be the "boss" and exercised his almost forgotten responsibility to discipline

employees who violated the rules. Accidents fell off sharply and other benefits were also realized. Morale was strikingly improved, absenteeism decreased and not too surprisingly, there was also a significant increase in productivity.

Let's go back again to Webster. Remember—he says that discipline also means "to teach." Ford Motor Co. accepts this meaning wholeheartedly and considers the teaching and training of its employees to be one of its most important functions. Sure, we realize that our prime function and reason for existence is to serve our customers with a top quality product at a price they are willing to pay.

But, to do this we must have a *trained, disciplined* work force, at all levels of the organization. For the purpose of this discussion, however, we are considering only how this policy affects our program to prevent accidents, with particular emphasis on the enforcement of safety rules.

In order for established safety rules to have any meaning, it is a prerequisite that the persons to whom they are to apply, have a thorough knowledge of their context and meaning. This is accomplished through a very thorough system of training for both supervisors and hourly employees.

These training techniques take many forms, and include:

1. A six months training period for new supervisors.
2. One-hour weekly training meetings with required attendance by all supervisors.
3. Frequent contacts between supervisors and plant safety engineers.
4. Wide distribution of safety rule booklets, to both supervisors and hourly employees.
5. Requirement that all supervisors of hourly employees hold weekly safety talks with their employees.
6. Indoctrination program for new employees which requires that the supervisor go over pertinent safety rules with the new man to insure he understands them. A check sheet and card which the employee signs must be returned to the safety office for each new employee.

But that is enough of detail. I think

you have the idea that the Ford Motor Co. has an excellent training program and does a good job of educating its employees on how to do a good job safely. We have given our employees the knowledge, now we must see to it that they use that knowledge to the best advantage—to the advantage that employees will not suffer accidents and injury from someone's disregard of safe practices established and spelled out in the rule books.

Let us take a quick look at how "constructive discipline" of a progressive nature works in cases which demonstrate the principles we have been discussing.

First, consider a simple theoretical case. Suppose that one of the plant safety engineers observed an employee working at a machine while he was not wearing his safety glasses, as is required of all Ford Motor Co. employees. The safety engineer contacted the employee's foreman and verbally informed him that the employee was exposing himself to the hazard of a potential eye injury.

Thereupon the foreman, knowing the employee has just returned from lunch and merely has forgotten to put safety glasses back on, approached the man and reminded him to do so. The man, being a cooperative individual, did so, with thanks to the foreman for reminding him. (*This man knows which side of his bread has the butter.*)

This man required very little correction since he realized that the eye protection rule was for his benefit. Just a word of caution was all the discipline (motivating education and correction) that was needed in this case and that was all that was applied. Mission accomplished!

Let us now consider a little more complicated and still theoretical case. Again, the plant safety engineer reported a worker, not wearing the prescribed eye protection, to his foreman. This individual was resentful and expressed himself fluently, indicating he did not want to comply with the rule requiring him to wear safety glasses.

In this case the foreman realized that positive action was needed to change this individual's thinking. The foreman, therefore, called the man into the department office and, explained to the employee that the Ford Motor Co. safety rule requiring all employees to wear approved types of

eye protection was established to prevent serious eye injuries, himself included.

The man was then informed that because his record did not show any previous citation for rule violations the disciplinary action report resulting from this case would show that he had merely been given a reprimand and warning without the loss of any time. The warning indicated that he had been informed that any subsequent violations of the rules might result in increased corrective action on a progressive scale.

Here again, the case was dispositioned with only enough "constructive discipline" to arrive at the desired correction of the employee's attitude and performance.

This program of scaled action to fit the case is carried out through the whole range of cases which might occur. Each succeeding time that it is necessary to apply disciplinary action to an individual employee, his previous record is taken into consideration. In those cases where it is clearly evident that the previous actions have not resulted in the expected improvement in the employee's attitude and behavior, additional motivation is applied, each step being progressively more severe.

In a few very serious cases, the end result may finally be a discharge. I am glad to be able to say that very few cases go to this extreme. The lack of extreme cases indicates that the system of progressive actions takes hold and does the job somewhere along the line before the final stage is reached.

Since a disciplinary penalty is imposed solely to obtain improvement of future behavior, follow-up is important in determining whether it has been effective, or whether further action is necessary.

Up to the present time we have dwelt extensively on the techniques utilized in the "constructive use of discipline in safety violations." Now, let's give a little consideration to the end results of such actions. This is the meat on the menu. This is the payoff. While we do not, by any means, give our company program of "constructive discipline" the whole credit, we are sure that it played a very important part of the recent accomplishment of the Cleveland foundry of the Ford Motor Co. in establishing a new all-time National Gray Iron

Foundry Best Record of 3,421,133 man-hours of exposure without a disabling injury.

We also are sure that this technique of using discipline for *corrective* purposes played an important part in the record of our two Cleveland engine plants. These two plants have, within the span of less than ten years, posted periods of over 3,000,000 man-hours of exposure without disabling injury on *seven* separate occasions.

The use of "constructive discipline" can never be the answer to all problems. It can, however, help in the efforts to create a *safety awareness* in our employees which we all are striving for. Safety awareness? Now there is a term I like! Turn that over on the tongue of your mind for a minute! Get the taste of it? Let me give you an example.

Recently, while I was walking through an aisle in our foundry at Cleveland, an hourly man walking in the same direction but some distance ahead, noticed a small length of pipe lying in the aisle where it had apparently fallen from a passing scrap truck. The man, with scarcely a pause, stooped down, picked up the pipe and tossed it into another scrap truck and continued on his way. It was done in such a casual manner it appeared to be an act of habit.

*That is what we want!* We want safety so ingrained in our employees that they exhibit similar thoughtfulness in all their actions. Thoughtfulness that is a *habit*! And there is no contradiction of terms in this instance.

Here was living proof of the "safety awareness" we are striving for. Here was evidence of one of the factors which helped the foundry set a new record, helped the foundry exceed the old record, which had stood for five years, by a margin of well over 500,000 hours. Here was evidence that, properly motivated, employees *can* be moved to consider the "other fellow's" welfare as well as their own.

This man's action may well have prevented the next man coming along from taking a bad spill. Such patterns of thought can cause a man who, in the past, had been guilty of leaving a guard off a machine, to now pause to replace it upon completion of his job. Development of such *safe* work habits can truly make a man become, almost unconsciously, his "brother's keeper."

We do not know whether this man had ever had occasion to have "constructive discipline" applied to him. We have no way of determining since the man was not identified. We like to think, however, that this is the sort of attitude which can be developed by the technique of applying discipline in a corrective sense, rather than in a punitive sense.

You all know what happens when you push a pendulum. You give it a push and it swings right back at you. If you give a man a push he also has the same reaction; he has a tendency to take a swing at you in return, in one way or another. It is our thinking at Ford that much more can be accomplished by *leading* a man onto the right road by correcting his errors in a constructive manner. This leading, nevertheless, must be firm to avoid being misunderstood as weakness.

Someone says, "Nuts! There are some guys you can't reach with anything but a big club and a size 14 boot." There may be some truth in this statement, but (and that is a *big* but) these cases are few and far between and we should not fall into the trap of accepting this as a dump for all of our problem children. It costs money, a *lot* of money, to train employees to perform today's complex jobs. It costs money, a *lot* of money, to have our employees suffer industrial injuries.

It is our job to save our employers from the unnecessary expense of discharging errant employees. It is *also* our job to save our employers from the unnecessary expense

of accidental injury. It is even more our job to discharge our moral responsibility of preventing the human misery to the employee and his family which invariably results when the bread-winner is laid low because he or his fellow-employee failed to heed the safety rules.

In nearing the conclusion of this discussion, let us remember that the old days of the woodshed as a symbol of discipline are gone and past. More enlightened thinking and the teaching of experience has opened a better door. A wider portal with broader vistas: "constructive discipline," based on correction, not punishment.

It is a prime tenet of psychology that the human animal has a greater tendency to remember pleasure than pain. How many of you can remember the occasions on which your Ma or Pa beat the bejabbers out of your little hind-end? I'll bet not one of you can, or, at most very faintly. On the other hand, I'll also wager that many of you can still clearly remember the old swimming hole, how much fun you used to have at the County Fair or many other pleasures of your childhood.

Not that we mean to imply that applying even "constructive discipline" to our employees will be a pleasure to them. Rather, we should attempt to remove as much of the pain as possible from our corrective action to lessen the tendency to forget unpleasant experiences. *Educate, teach, correct*, that's the ticket. Punishment for punishment's sake belongs to the Dark Ages.

## SAFE APPLICATION OF ELECTRIC CONTROLS ON MACHINE TOOLS

By F. C. PEREGOY

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By definition, machine tools include all power-driven equipment performing cold-working of metal by progressively removing metal in the form of chips. The National Association of Machine Tool Builders has classified some 200 types of machine tools under five basic functions—turning, boring, milling, planing and grinding.

Authorities agree that injuries from machine operation are likely to be more severe than injuries from other causes; and more likely to result in permanent disability. For example, Accident Facts shows machinery to be the source of 10 per cent of all injuries, but the source of 19 per cent of permanent disabilities.