382 WITHDRAWN

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TRAINING MANUAL NO. 139

SUPERVISORY SAFETY TRAINING

DEPARTMENT OF STATE

AGENCY FOR INTERNATIONAL DEVELOPMENT

COMMUNICATIONS RESOURCES DIVISION

WASHINGTON 25, D. C.

WITHDRAWN

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SUPERVISORY

SAFETY TRAINING

MANUAL

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Prepared by

Bureau of Labor Standards
U. S. DEPARTMENT of LABOR

For

Publications and Technical Services Branch
Communications Resources Division
AGENCY for INTERNATIONAL DEVELOPMENT

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SUGGESTIONS FOR THE CONFERENCE LEADER

INTRODUCTION

This basic "Supervisory Safety Training Manual," the first of a new training series, was prepared as a result of requests from AID Missions. It conforms to the general concepts of the JIT, JMT and JRT series that are now being used for the training of supervisors in countries outside the U.S.A. This manual should not be construed as a complete course in industrial safety. Rather, it has been developed as a short course for supervisors of the same level only to acquaint them with the basic concepts of industrial safety.

PURPOSE OF COURSE

The purpose of the course is to provide basic accident prevention information for the training of key supervisory personnel in other countries so that they will (1) be able to recognize the type of conditions that result in accidents, and to select and apply effective corrective measures; (2) be familiar with the ways and means by which safe performance is assured; and (3) have a better understanding of the scope of accident prevention, and the types of study needed for a more complete knowledge of the field. To be effective and permit the students to derive greater benefit from the course, the classes should be limited to 15 to 20 participants.

EXHIBITS, VISUAL AIDS AND TEACHING MATERIALS

The efficient use of safety charts, blackboard, safety equipment, and other demonstration materials will greatly assist in teaching this course. At the end of the course, plant visits should be made to selected industries and specific factories, if possible. When a course is given to a group of supervisors from only one factory, then the visits should be made to selected areas of that factory. On these visits, the trainees can view at first hand the principles discussed in the course.

TEACHING METHODS

The discussion-conference method of presentation of the subject matter is to be used, with basic concepts of JIT procedures.

There will be an orderly presentation of facts in accordance with a carefully prepared outline, folowed by open forum discussion--a free exchange of ideas to develop all possible viewpoints.

NOTE; Additional manuals planned for the series will cover such subjects as Job Hazard Analysis, Stimulating Employer Interest, and Plant Inspection Procedures.

The position of the instructor is that of a moderator, chairman or leader in the conference phase. In order for this type of teaching to be effective, it is necessary that the group have some knowledge of the subject and have satisfactorily completed at least the regular JIT course of instruction prior to undertaking this safety series.

REFERENCE MATERIAL

Outside study and independent thinking are prerequisite for successful training. The recommended text material is but a small segment of the total literature on industrial safety.

The following publications should be made available to the students for independent study outside of the classroom:

1. Supervisor's Safety Manual - National Safety Council

2. Handout Material:

   a. Accident Causes
   b. How to Investigate Accidents
   c. Accident Cost Control
   d. How to Compute Injury Rates
   e. Elements of a Safety Program

PREPARATION OF THE INSTRUCTOR

The instructor should have completed as a minimum one or more of the JIT, JMT and JRT series of courses and the full Accident Prevention Course as covered in TAB Training Manuals 73-80, Industrial Safety Leader's Guides, Series A-H, inclusive, which he studied under an instructor of the International Division of the Bureau of Labor Standards.

He should have and be familiar with all student "hand-out" material of that latter course, including Labor Standards Bureau Bulletin 67, Safety Subjects.

He must know how to win and hold the interest of the students, and how to utilize that interest to develop usable knowledge through active participation by the students. Through personal contact and interviews (including visits to places of employment, if possible), the instructor must become acquainted with the natural ability, educational and industrial background, and the desires, interests, and objectives of his students.

He is responsible for obtaining equipment and supplies needed for teaching the classes, such as hand-out material, visual aids, special demonstration equipment, and for indicated plant visits. This should be done well in advance, especially in overseas classes, since such material or equipment cannot be obtained on short notice.

SAFETY TRAINING TECHNIQUES

It is of utmost importance that the instructor become acquainted with some of the basic training techniques in order to better prepare himself to conduct the course successfully.

Planning

1. The instructor should have such visual aids as are pertinent to the subject-matter of the course. These should be set up in the proper sequence. An indication or note on the instructor's outline could be very helpful to guide him when a particular visual aid should be used.

2. The course outline as well as the handout material and the visual aids should be checked at regular intervals. This should be done by the instructor in order to revise, improve and modernize the course presentation. The material should also be checked to make sure that it conforms with policies of labor and management in the country where it will be presented.

3. The instructor's outline should be adapted by him to his particular method of presentation, keeping in mind that this is a discussion conference type of session.

4. The instructor would do well to get an advance list of the students that will participate and their positions and background. A study of such information could be very helpful to the instructor when he faces his class.

Preparation of Classroom

Many conferences and courses have failed simply because no preparation was made for the classroom facilities.

1. The classroom should be located in an area where there is the least amount of noise or distraction.

2. Good ventilation, lighting and sufficient room are important aspects to consider.

3. The seats and seating arrangement should be comfortable as well as informal. A round-table seating arrangement is the most effective for discussion conference sessions.

4. The room should be equipped with a good blackboard, sufficient chalk, and a clean eraser. A stand should be available for mounting the charts and visual aids to be used during the conference. A 35 mm slide projector should be available.

Teaching

1. An official of the organization should open the first session with a statement regarding the general objectives of the course. He then should introduce the instructor to give him the proper posture in relation to the group he will teach.

2. At the first session the instructor should open with an explanation of the course objectives and its method of presentation. At this time he should draw upon his experiences to relate an illustrative incident that will bring him in closer relationship with the group and, at the same time, enable him to introduce the theme of the first session.

3. The course should be presented by employing the discussion-conference method.

4. The instructor should have the class follow a pre-determined schedule and maintain order at all times. Only one participant should be permitted to give his viewpoint at a time. The instructor should keep the class discussion within the subject matter as contained in the instructor's outline.

5. If possible an official should be asked to speak at the termination of the course.

Tips for Instructors

Learning is actually the acquisition of new ideas, abilities and skills acquired through the senses of hearing, seeing and feeling by touch.

1. New ideas are conveyed through the presentation of knowledge, and thought is stimulated through the student's sense of hearing.

Abilities and skills are presented through the media of telling, demonstrating, and having the student demonstrate under the supervision of the instructor. The student acquires abilities and skills via the senses of hearing, seeing and feeling by touch.

2. An important aspect of teaching is to remember that the student absorbs more when he participates in a discussion. The instructor therefore strives to get 100% class participation.

3. The instructor should become aware of outstanding characteristics of his students. This could be very helpful when leading discussions. For example:

a. Some may be more mature.

b. Some may have a knowledge of safety.

c. Some may have actual experience to draw on in the discussion.

d. Some may have a faster learning speed than others.

e. Some may be "stallers" who can slow down the discussion.

f. Others may be aggressive and want to monopolize the discussion.

g. There may be a "know it all" in the group who must be properly controlled.

h. Some may be constant late-comers who ask questions about previous discussions and delay the class.

4. The teaching process consists of:

   a. Telling--This means giving background infomation to introduce a subject.

   b. Showing--A demonstration of some equipment pertaining to the subject to be discussed is very impressive.

   c. Illustrating--Using charts, blackboard, slide or films are very helpful to highlight specific points in the discussion.

   d. Discussion Conference--The participation of the students in formulating their thinking about the subject under discussion is fundamental to getting the most out of the session.

   e. Conclusions--The Instructor's summation of the session should knit together the points discussed during the session, and should include other important details that may have been overlooked by the group.

   f. Questions--During the session, the instructor should use questions to stimulate discussion, and also to help bring the discussion back to the subject matter if it has strayed.

GUEST INSTRUCTORS

It is necessary that the instructor be granted full reponsibility for conduct of the class; at times, however, he may wish to call in an expert in a particular field as a guest instructor (or lecturer). In such event, it is essential that the instructor maintain control of the course.

The instructor must tie in the work of the guest instructor with the balance of the course; he must outline the phase of the subject to be covered by the guest and satisfy himself tnat the guest limits himself to the field as outlined; he should summarize the guest's contribution, pointing out its relative importance in the field of accident prevention. While use of a few guest instructors (properly utilized) can add to the effectiveness of the course, a series of "lecturers" whose topics are not correlated, will inevitably result in confusion.

It is recommended that "guest experts" be used only for <u>supplementary</u> training, and not to replace even part of this course which should be taught by <u>one instructor</u>.

SESSION I

INTRODUCTION TO THE COURSE

Note:	Check to see that visual aids and other course materials are in order and ready to use.

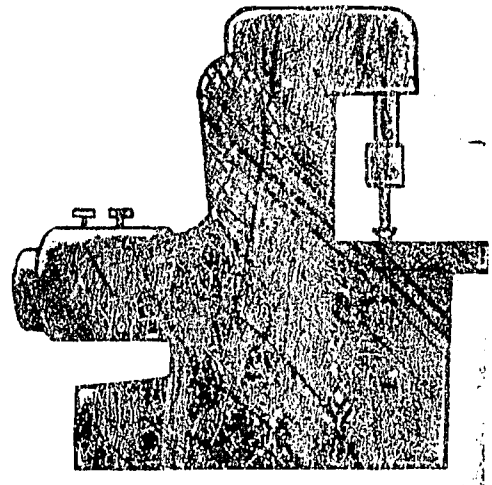
Introduction by official.	Confer with official prior to opening to be sure what he is going to say.
Discuss course schedule.	15 hours total 3 hours per day with 15 minute breaks after 1-1/2 hours.
Hand out registration cards.	Have each participant fill in his name, title, company, previous training in safety, etc.
Discuss class procedures.	
Informal	Discussion-conference sessions.
Class participation	Instructor acts as leader of discussion. Students participate in discussion.
Assigned study material	References: Supervisor's Safety Manual and the daily student handout material.
Certificate	Indicate here if a certificate will be issued for completion of course.
Previous courses	Cite value of other supervisory courses including JIT, JMT and JRT and lead into first subject.

OUR OBJECTIVES

Safety and Supervision

Safety Orqanizatio

A Safe Workplace



Safe Work Methods

Chart No. 1

SUPERVISORY RESPONSIBILITY FOR SAFETY

OUR OBJECTIVES
Chart No. 1

Objective: To establish the supervisor's responsibility for safety, the relationship of safety to production, and the organization necessary to achieve this goal.

> Note: Draw from class and board the responsibilities of supervision. Tie them together into four main points and explain.

A. Responsibilities of Supervision

1. Planning Jobs	Safe tools and equipment - safe methods and processes - distributing workload - preparation for emergencies - scheduling time.
2. Using Authority	Know your limits - use with discretion - create good discipline - do not use punishment unless absolutely necessary.
3. Passing information	Instructions from your superior - make sure you understand - explain well so worker understands - report to your superior. Example: Management's policy on plant safety. Safety policies must start at the top.

Management must set the policy and make it clear to all levels of supervision that they support the safety program and that each supervisor will be held responsible for the success or failure of the program in his department or area of authority.

4. Getting Results Through Others

See that each of your men knows exactly <u>what</u> he is to do - <u>how</u> he is to do it - <u>has a desire</u> to do it.

B. <u>Making Decisions</u>

What would you do?

Explain to the group that supervision requires decisions and answers that are not always readily available.

Note:	Distribute "What would You Do?" - Ask group to check one answer. (Need not hand in)

Why?

A discussion of individual answers and reasons why should bring out some interesting aspects of supervision.

Note:	Board answers and then combine to point up some elements of good supervision. Discuss each with class.

C. GOOD SUPERVISION AND SAFETY
Chart No. 2

Safety has no simple formula - many elements of good supervision had to be considered in deciding answers.

SAFETY in SUPERVISION

Planning ...

Job Instruction ...

Industrial Relations ...

Production ...

Morale ...

Chart No. 2

1. Good Planning	Safety must be integrated into the planning of method, time, cost, scheduling and manpower usage.
2. Good Job Instruction	Should include safety orientation for new employees and on-the-job instruction as a follow-up by supervision. A job assignment, if given correctly, should include safety requirements.
3. Good Relationship	This is a concept of cooperation and the stimulus for good worker and supervisory attitudes. Safety must be included in this area for effective overall relationship.
4. Good Production	This constitutes good quality and quantity production with controlled waste. To be efficient it must include safe operations with a control of accidents.
5. Good Morale	Maintaining a well disciplined staff with good morale is an important aspect of good supervision. Safe working conditions and a good safety program are of extreme importance in building good morale.

D. Thread and Cloth

SAFETY--ONE THREAD

Chart No. 3

Safety runs through

In other words, safety is an integral part of good supervision. Consider cloth as your area of responsibility. The thread of safety runs through entire cloth of your supervisory responsibility and cannot be separated without damaging the cloth.

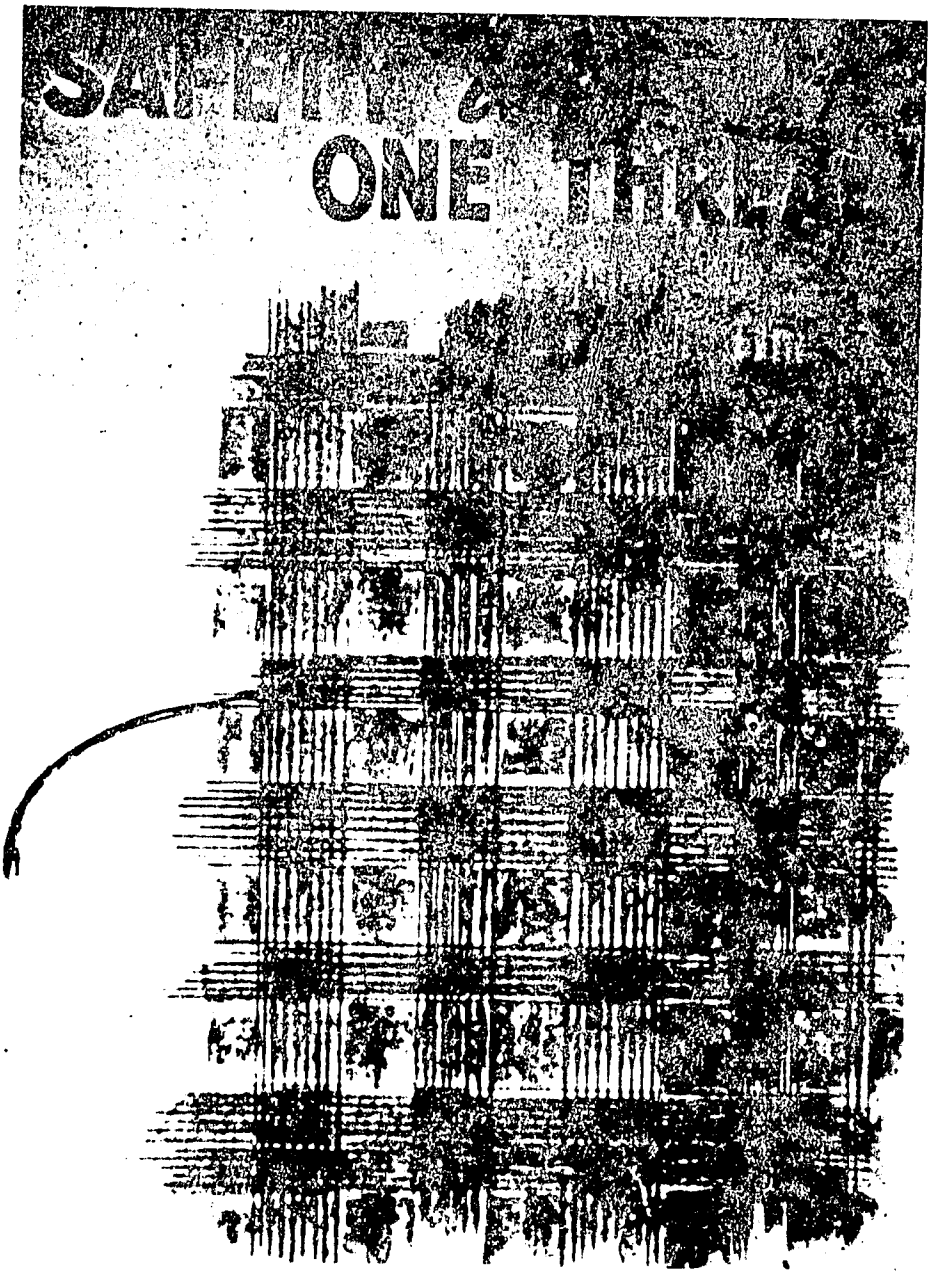


Chart No. 3

SESSION II

BASIC ACCIDENT CAUSES--INVESTIGATION AND ANALYSIS

A. The Accident — Define and Discuss

Define accident — Any unexpected, unplanned occurrence that interferes with or interrupts the orderly progress of work being done.

> Note: Develop and expand as below in "B" Class may have others also, but it is best to list all. Then combine and with their approval end up with list below.

1. May Involve

a. Men	Person
b. Material	Product
c. Machinery	Machines; Motors, Transmission of Power, belts, pulleys
d. Equipment	Trucks, Conveyors
e. Time	Down-time of Injured Worker

> Note: Repeat an Accident (definition) may result in damage to: Then develop discussion below from notes on board.

What is an Industrial Accident

Chart No. 4

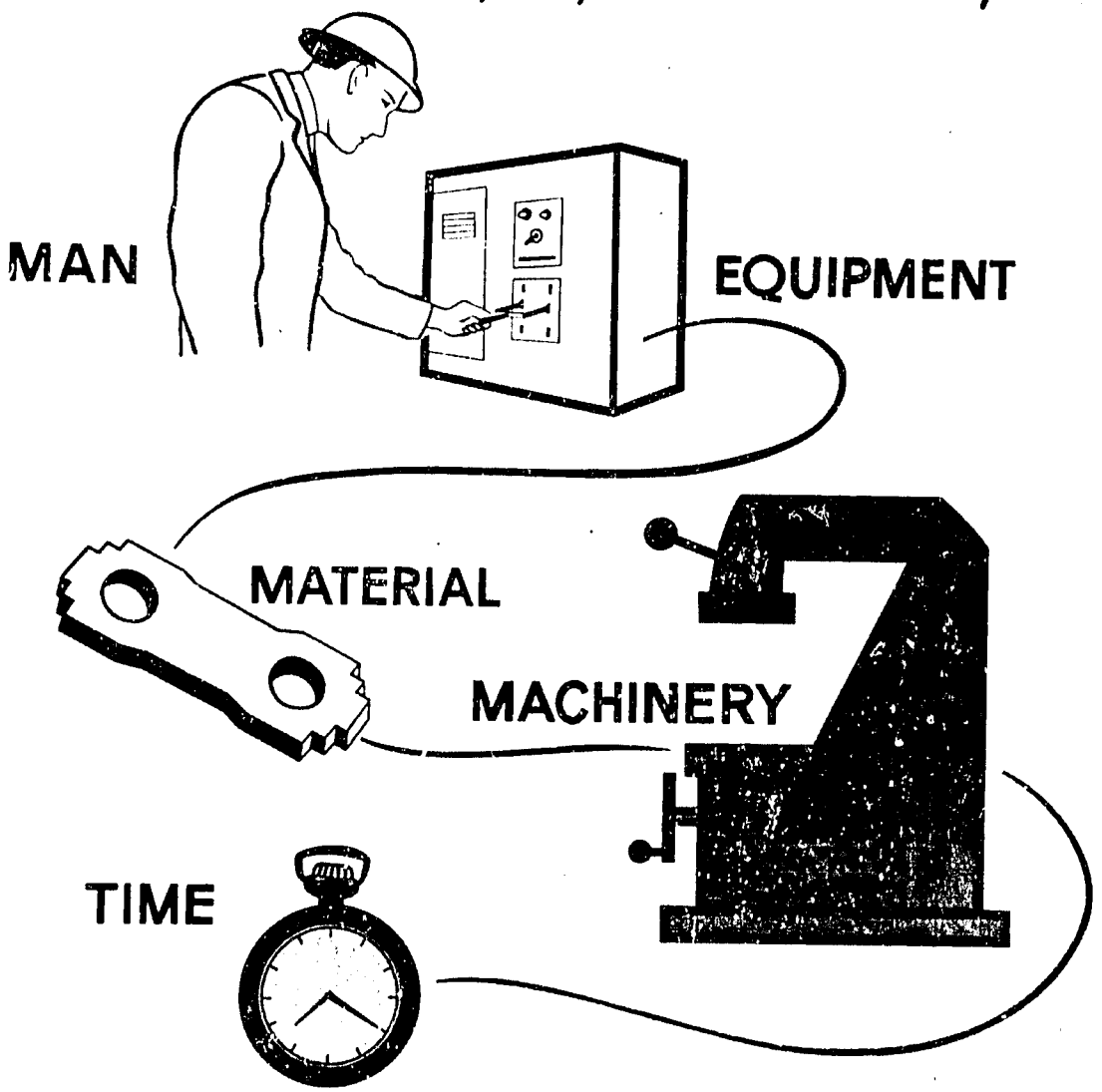
2. Will result in damage to: — Any one or combination

a. Material — These are not usually reported and are difficult to detect as workers (and

WHAT IS AN INDUSTRIAL ACCIDENT?

AN ACCIDENT = *any occurrence that interferes with the daily progress of work.*

AN ACCIDENT *in industry may involve the following:*



supervisors) tend to disregard or to "hide" the results.

b. Machinery — Not always known unless major damage.

c. Equipment — Not always known unless major damage.

d. Time — If time only is involved, there may be an accumulation of goods in process, production slow-up. Check scrap pile.

e. Men

Injury* — Only one of the possible results of an accident.

Importance — Usually reported - gives safety investigator a starting point.

Note: Give definition of disabling injury below.

* (A disabling injury is one that renders the injured person unable to perform a regularly established job which is open and available to him during the entire time interval corresponding to the hours of his regular shift on any one or more days subsequent to the day of his injury.)

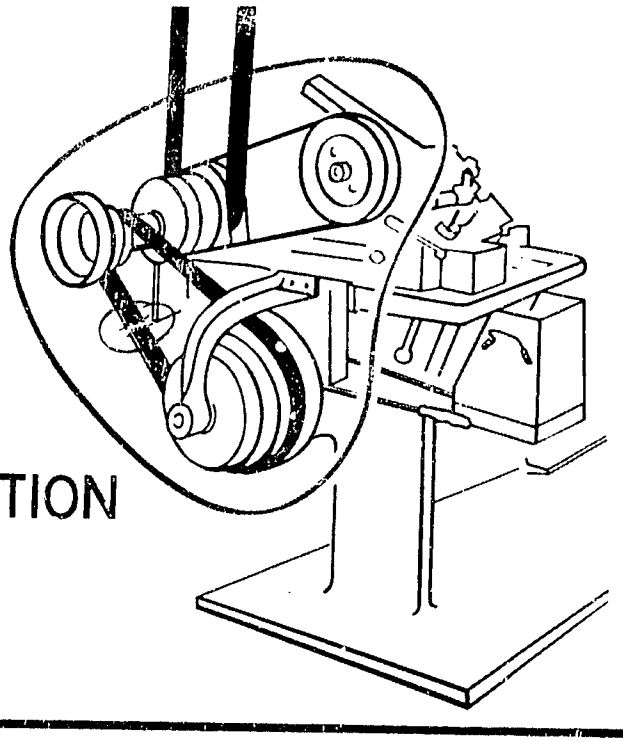
Note: (Erase Blackboard:) Define Accident Cause. Write on Blackboard. Develop Discussion as below. Ask Questions.

B. <u>The Accident Cause</u> — The condition and/or action immediately preceding the accident.

Accident Causes
Chart No. 5

After an accident has occurred, an investigation should be made to determine

ACCIDENT CAUSES



UNSAFE CONDITION

UNSAFE ACT

Chart No. 5

the cause or causes. Generally this opportunity does not present itself unless there is a personal injury or extensive property damage (machines, equipment or buildings).

Note:	Develop by asking questions and board answers.

To find the cause or causes, we must start with the results of the accident:

1. Injury (or) — Cuts, bruises; broken bones, etc.

   Damages to property — Smashed truck; crumpled conveyors; burned paint shop, etc.

Note:	Define "Accident Type" and discuss, emphasizing that it is not a "cause" of the accident.

2. Accident Type — Cause in, on or between; struck by; fall different level; fall, same level, etc.

Note:	Statement - "Next we search for the condition and/or action which immediately preceded the accident, and was (or were) directly responsible for the accident." Write "Unsafe Condition" on the board and develop discussion.

3. Unsafe Condition — A hazard which existed, mechanical or physical, within the working area which could have been guarded or corrected. Such as, unguarded machinery. The correction of the unsafe condition is the reverse of the cause.

Note:	Write "Unsafe Act" on the board and develop discussion

4. <u>Unsafe Act</u> — A violation of a commonly accepted safe practice or procedure. Such as operating an unguarded machine.

Note:	Explain that investigators should check carefully all facts connected with the unsafe act to determine the Personal Factor which was the cause of the unsafe act. Write "Personal Factor" on Board and discuss. Show that these acts have been due to lack of knowledge, improper attitude or physical or mental handicap.

5. Personal Factor — That which influences actions of individuals which contribute to the commission of an unsafe act, (actually the cause of the unsafe act).

Note:	Board (Sometimes More than One).

These are a. Lack of knowledge
b. Improper attitude
c. Physical or mental handicap
(Sometimes more than one involved)

Note:	Write "Corrective Measures Indicated" on Board and Develop Below by Questions.

6. Corrective Measures Indicated
   a. Instruction
   b. Discipline
   c. Placement

MAKE THIS TEST

FOR EACH ACCIDENT

1		2		3
WHAT IS THE UNSAFE		WHY THE UNSAFE		RECOMMENDATION TO CORRECT
CONDITION	ACT	CONDITION	ACT	
CAUSES				

Chart No. 6

Note: Erase the Board.
Write "To Find the Cause"
1. Develop the Method
2. Analyze
3. Explain and Discuss

C. To Find the Cause

1. Develop the Method

Keep simple but specific so the unsafe condition and/or unsafe action (responsible for the accident) can be recognized and corrected.

Make This Test
Chart No. 6

2. Analyze

a. Unsafe Conditions

What
Why (unsafe)

Unsafe Condition	
What	Why

b. Unsafe Act

What
Why (unsafe)

Unsafe Act	
What	Why

Board

3. Suggested Corrections

Recommendations for eliminating the cause after gathering all pertinent facts - Reverse causes for correction.

Note: Develop discussion as below

D. Avoid Faulty Conclusions

1. Carelessness

Too general a term

a. It is not a cause

b. Use should be avoided

2. 88-10-2 Ratio — Commonly called 85-15-Ratio

Explain

a. Primary Cause — A Heinrich study of compensation reports, that attempted to fix a primary cause.

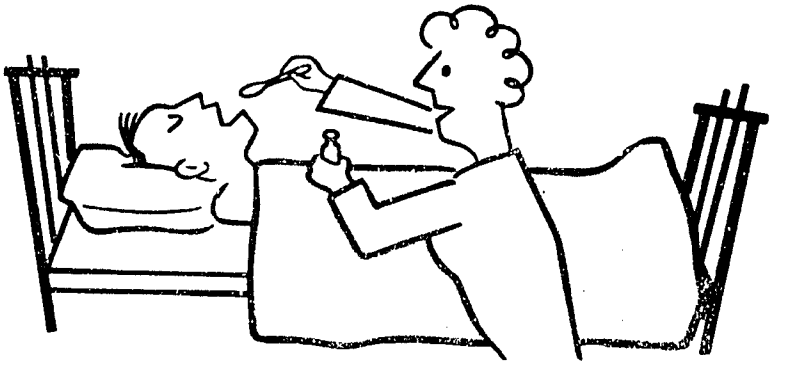
b. Misleading — Could be used as an excuse to avoid correcting unsafe conditions. Most accidents are the results of a combination of causes.

Note: Now have Students read over the case of the accident to "William Smith." Discuss and decide on "Causes" and "Corrections."
USING THE CAUSE ANALYSIS HANDOUT

ACCIDENT COSTS

COST OF WORKER INJURY TO MANAGEMENT

A MEDICAL



B COMPENSATION

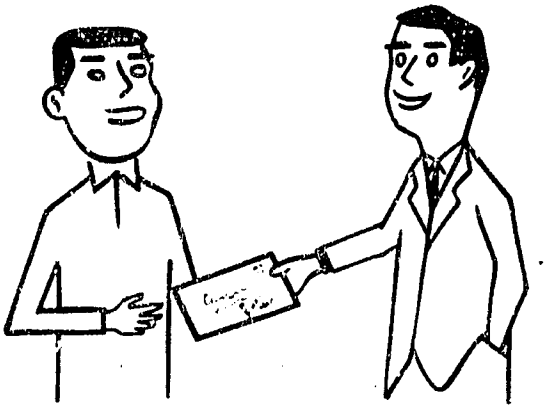


Chart No. 7

SESSION III

ACCIDENT COST CONTROL

Note:	Develop purpose with class - List on board and combine.

A. Purpose

1. Show need for Accident Prevention Program	A program for Accident Cost Control must show, "how much accidents really cost," and will assist in determining the Safety Program in a plant.
2. To enlist support of management.	The interest and support of management will be stimulated when shown on a profit and loss basis.
3. To enlist support of others.	1. By supervision when made familiar with Production Costs. 2. By workers and unions interested in Job and Personal security.

B. Determining Accident Costs

Note:	Ask class what factors are involved and develop on board with class.

Accident Costs--Medical and Comp.

Chart No. 7

1. Manpower	Medical and compensation as well as loss of production time of injured employee and his replacement.

ACCIDENT COSTS

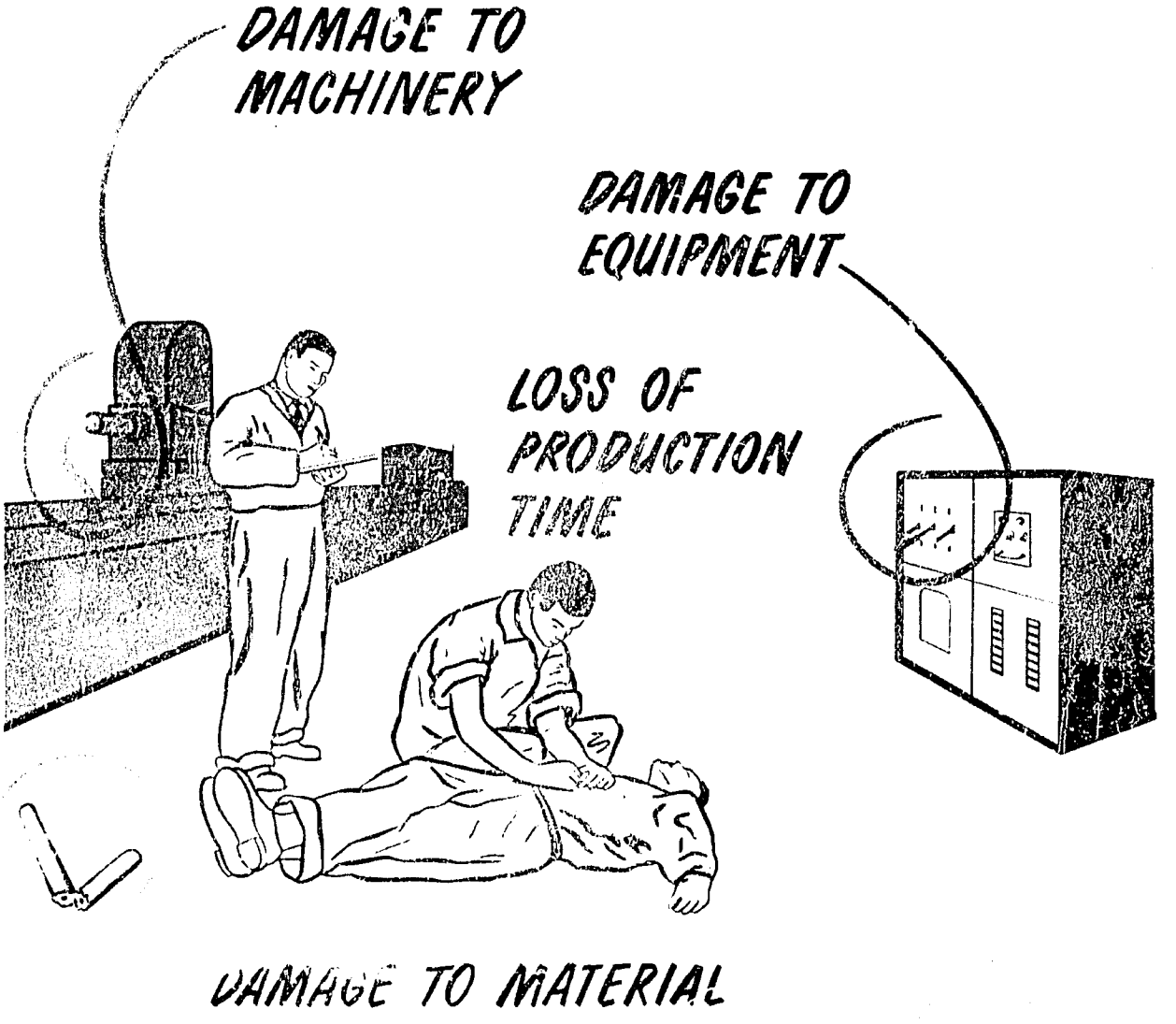


Chart No. 8

2. Material — Cost of damages to material and loss of production time.

Accident Costs - Material - Machinery - Equipment
Chart No. 8

3. Machinery — Cost of repair or replacement; damaged machinery and loss of production time.

4. Equipment — Cost of repair or replacement to buildings and equipment such as; buildings, electrical system, tables, chairs, trucks, etc., as well as loss of production time.

C. How to Start an Accident Cost Control System

(A complete program must be predicated upon the reporting and investigation of all accidents whether or not they result in injuries.)

1. Form (see attached) — The same form may be used for reporting all accident costs.

Note: Discuss form with class.

Note: Develop procedure with class and ask questions.

2. Procedure

a. Get cooperation — Two key groups that can make this procedure successful are (1) the supervisors and (2) the accounting office.

(1) Supervisors — They are in the best position to discover, investigate and report accidents

for cause and extent of damages. (They must be sold that this is not just a system to be used to place blame on them)

(2) Accounting Office — This office should keep a separate record of repair and replacement costs of damaged machines, material, and equipment. Also, costs due to loss of production time resulting from accidents.

b. Submit Form to Safety Department — The Safety Department should be charged with the responsibility for making a final investigation and tabulation of accident costs. These should be discussed with management and at central and departmental safety committee meetings.

c. Charge back to Department or Departments Concerned — The costs of accidents should be added to the production costs in each department responsible.

d. Start with Disabling Injuries — To simplify the start of such a program, it might be advisable to begin with the investigation of accidents resulting in disabling injuries only. Later, when the procedure is in operation, and cooperation from those concerned is obtained, (i.e., workers, foreman, and accounting office is sold that this is

not a procedure to place blame) the program may be extended to include minor injuries and no-injury accidents as well.

D. Possible Effects

Note: Develop with class and board

1. Incentive

A good accident cost control program creates a greater incentive for management supervisors and workers to actively participate in an accident prevention program.

2. Part of Production

This system should also help to place accident prevention as a part of production and routine plant operation and administration.

SESSION IV

DETERMINING INJURY FREQUENCY AND SEVERITY RATES

Note to Instructor

In presenting a discussion on "Determining Injury Frequency and Severity Rates," it is important to make clear to the group that the terms "Accident, Injury, Disabling Injury, Frequency Rate, Severity Rate," are very precise, and should always be used to represent the exact scope under discussion (within the meaning of each definition).

Thus:

"Accident"	always means unscheduled or unplanned event, etc., does not always result in damage to machines, equipment or personnel. Only time loss may be involved.
"Injury"	always means "result of damage to one's person," it is the result of an accident.
"Disabling Injury"	always means an injury which renders the person unable to work for a time. It is the result of an accident.
"Frequency Rate"	always means the number of disabling injuries per million hours worked.
"Severity Rate"	always represents the number of actual days lost (per million hours worked) through "Temporary Total disabling injuries," plus time charges on "permanent disability injuries."

It is largely a matter of "chance" whether an "accident" results in only "time" lost, or in damage to material in process, or to equipment, or machines, or to personnel. It is largely a matter of "luck" if the injury is a "disabling" one or only a "minor" one or if it is a "fatal" injury. Many times the extent or "severity" of an injury will depend upon any one or more of a multitude of situations.

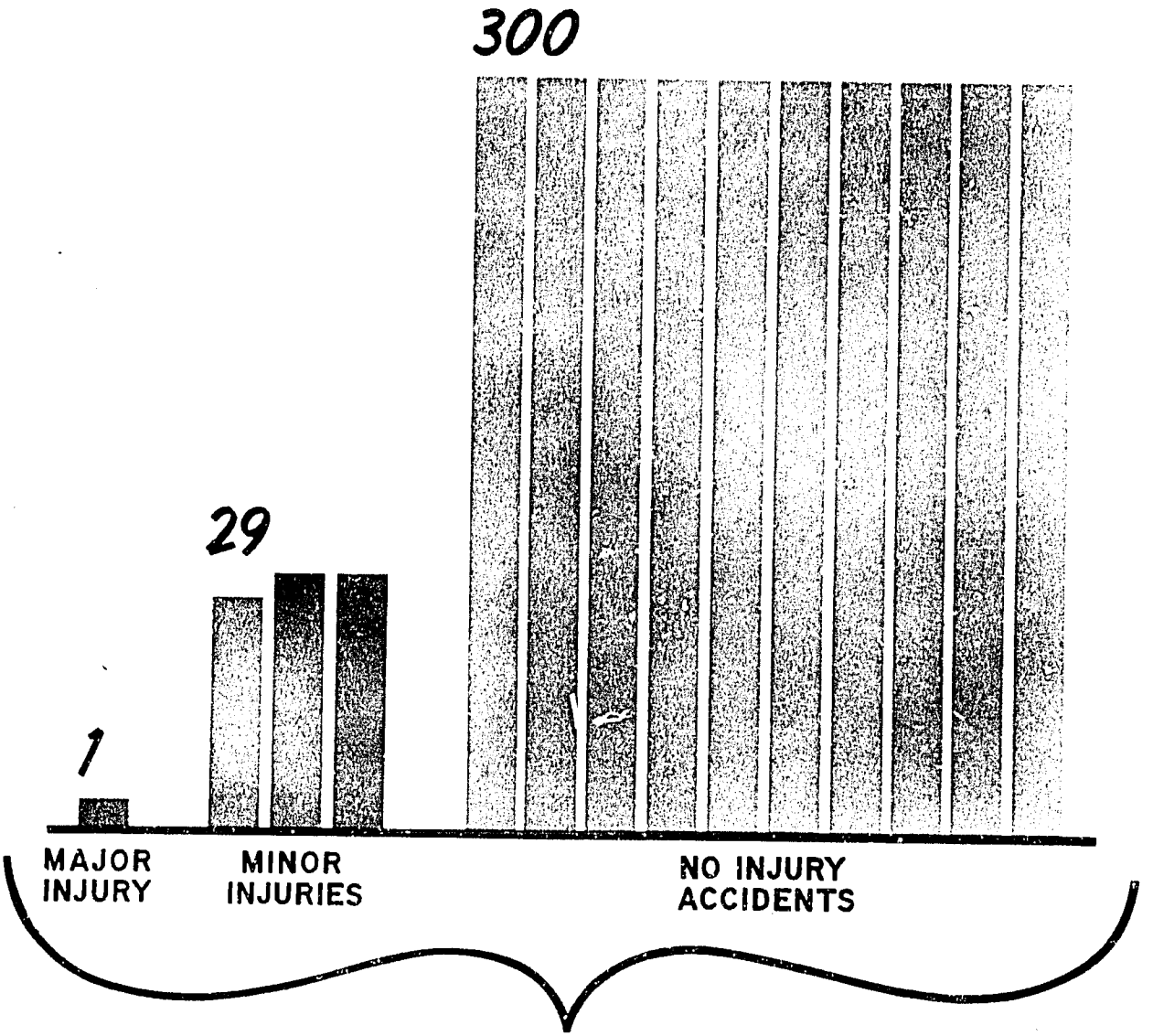
The element of "Control" lies in preventing as many accidents as possible thus reducing the number of chances for injuries from accidents.

Severity can be partially controlled or reduced in many plants through proper safeguarding of machinery.

This particular class will demand considerable ingenuity on the part of the instructor, in that there is extensive material to be presented, which is in the nature of definitions or explanations which must come from the instructor. Discussion can be stimulated especially on examples by such questions as, "What has been your experience on a situation such as this?" or "What would be your reaction if you were the supervisor in a similar case?"

In making statements of fact, these should be very clearly stated in order to guide or assist members of the group to a proper solution. (A poorly worded statement will confuse their thinking and may lead to arguments in place of discussion).

ACCIDENTS VS INJURIES



TOTAL

330 ACCIDENTS

OF THE SAME TYPE

Chart No. 9

Note:	Explain and discuss referring to Special Information in Foreword.

A. "Accident" and "Injury"

1. Terms Misused	Even those familiar with accident prevention may use terms improperly.
2. "Accident" explained	"Unforeseen, unplanned event", etc. Does not always involve "injuries."
3. "Injury" explained	Result of damage to one's person. Also define again "disabling injury."

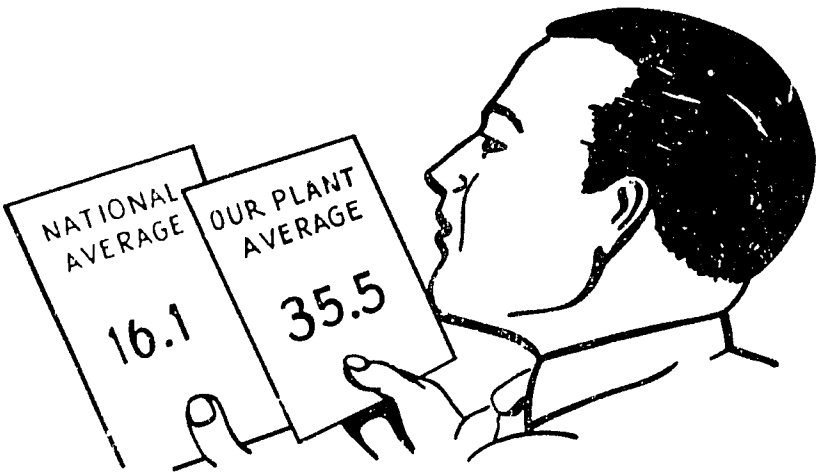
Accidents vs. Injuries
Chart No. 9

B. Heinrich's Theory

"Foundation of a Major Injury" (1-29-300)	Very valuable information but cannot be blindly applied. It should be used to show that unsafe practices and unsafe conditions may be in existence for some time without a disabling injury, but if continued, there will be "accidents," and if "accidents" continue, minor injuries will result, and if continued long enough there will be a "major injury." Actually if we are to prevent "major injuries", we must prevent accidents, and to prevent accidents we must do everything in our power to eliminate the causes, i.e., "unsafe practices and unsafe conditions."

USE OF INJURY RATES

SHOWS SERVICE NEEDS



MEASURES PERFORMANCE

Chart No. 10

Note: Write on Board "Use of Injury Rates". Bring out by discussion Points A-B-C-D and any others class may believe important. Try to hold but do not argue.

C. Use of Injury Rates

Chart No. 10

1. Reveals experience

A study of plant or company injury rates, reflecting its experience over a substantial period of time (i.e., a year or more), will help to bring to the attention of all concerned the actual experience in that plant or company.

2. Shows Service Needs

High injury rates are an indication of possible problems to be solved, and a study should indicate where and how the remedies should be applied.

3. Measures Performance

Allows comparisons to be made with like plants or companies in the same or other industries, or State or National averages.

4. Indicates Effeciency

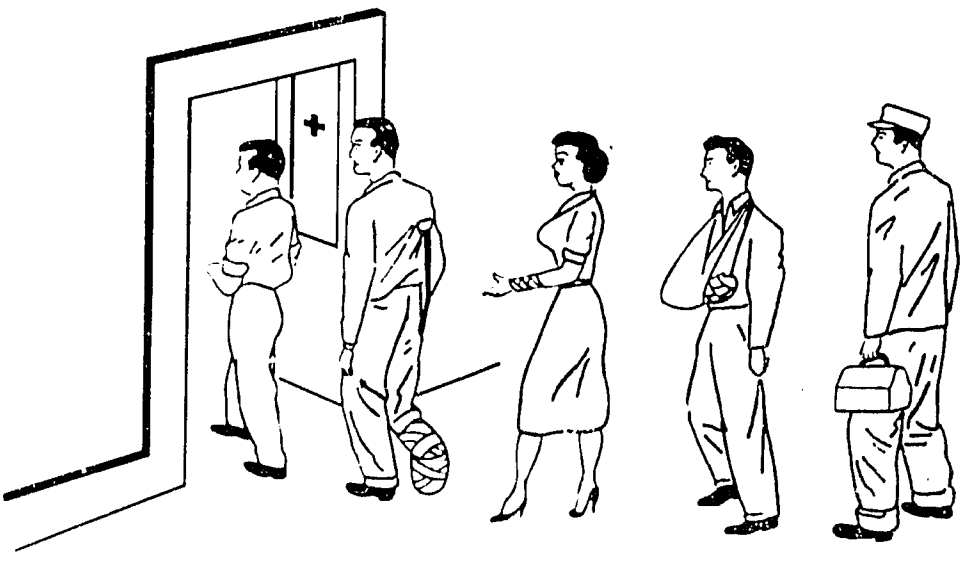
Any accident is an indication of an error which has interfered with production and has resulted in increased production cost and lowered efficiency. As injury rates generally reveal some of results of the most expensive accidents, they will assist in creating interest by management.

FREQUENCY RATE DEFINED

AS THE NUMBER OF DISABLING INJURIES PER MILLION EMPLOYEE-HOURS WORKED

FORMULA

$$F = \frac{\text{NUMBER OF DISABLING INJURIES} \times 1{,}000{,}000}{\text{NUMBER OF EMPLOYEE-HOURS WORKED}}$$



DISABLING INJURIES

Chart No. 11

Note: Put "Frequency Rate" on Board and Develop by Discussion

D. Frequency Rate Defined

The standard accepted method of measuring "disabling injuries", is known as the "Frequency Rate" or "Injury Frequency Rate".

Frequency Rate Defined

Chart No. 11

1. Definitions - Disabling Injury

Note: Distribute Handout and Discuss

Note: Discuss with Class, and Board Answers

2. Exposure - Definitions

Man-Hours Worked

The total number of hours worked by all employees in a given plant or operation, for a given period of time. Example: Company A employs 50 people in the office, 15 maintenance workers and 435 production workers. The actual hours worked in one month are found to be:

Office	-	8,255
Maintenance	-	2,600
Production	-	72,800
Total Man hrs.	-	83,655 for 1 month.

Note: Discuss with Class, and Board Answers

E. Estimating Man-Hours Worked

(40 X 50 weeks = 2,000 hrs.)

The average employee who works a 40-hour week can be assumed to work 2,000 man-hours per year.

1. No. of full time employees X 2,000

In order to determine the man-hours worked by full time employers.

2. Estimate part-time work

Estimate the number of hours worked by part-time employees, and the number of hours of overtime.

3. Add full-time man-hours
part-time man-hours
over-time man-hours

Add these figures and you have a fairly good estimate of the total annual number of hours in which the employees have been exposed to injury for that year.

Example: 500 employees X 2,000 = 1,000,000 + 10,000 part and over-time = 1,010,000 hours per year. These estimates can be made on an annual, semi-annual, quarterly or monthly basis.

Note: Discuss and Board Answers

F. Calculating Injury Frequency Rate

1. Obtain number of disabling injuries

They may be obtained from the records in the plant, insurance carrier or Ministry of Labor, for a desired period of time.

2. Obtain hours worked

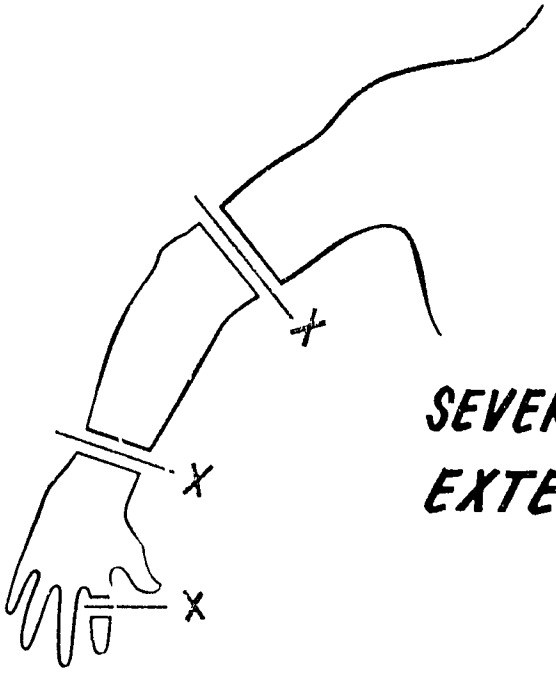
They may be obtained from the accounting department. If not available they may be estimated in accordance with the procedure described above.

SEVERITY RATE DEFINED

AS THE ACTUAL TIME LOST (DAYS)
PER MILLION EMPLOYEE-HOURS WORKED

FORMULA

$$S = \frac{\text{TOTAL DAYS LOST} \times 1{,}000{,}000}{\text{NUMBER OF EMPLOYEE HOURS WORKED}}$$



SEVERITY RATE =
EXTENT OF INJURY

Chart No. 12

3. Calculate - using formula

$$F = \frac{\text{No. disabling inj. X } 1{,}000{,}000}{\text{man-hours worked}}$$

Example: In one year - 48 disabling injuries, 500 employees, 10,000 hours - part and over-time

$$F = \frac{48 \text{ X } 1{,}000{,}000}{1{,}010{,}000} = 47.5$$

4. Why 1,000,000 hours

1,000,000 hours is used as it is a convenient and accepted unit of measurement.

Note: Have class give examples from actual plants and work out frequency with class on board.

G. Severity Rate

Severity Rate Defined
Chart No. 12

The injury-severity rate - a measure of the severity of injury as determined by the number of days lost from work.

Note: Distribute Handout "Define Disabling Injury"

When to use time charges
Chart No. 13

In permanent disability as well as deaths, do not consider actual days lost, only time charges. In temporary disability use actual days lost.

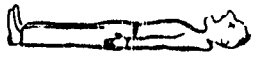
Note: Flip chart back to "Severity Rate Defined"

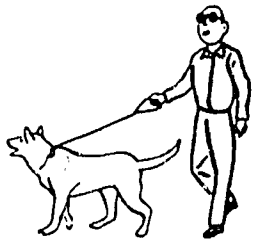
H. Calculating Severity Rate

Note: Distribute Handout "Calculate Injury Severity Rates"

WHEN TO USE TIME CHARGES

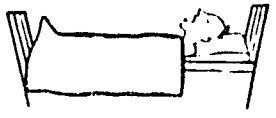
DEATH





X PERMANENT TOTAL DISABILITY

X PERMANENT PARTIAL DISABILITY



TEMPORARY TOTAL DISABILITY

Chart No. 13

I. 1. Obtain number of days lost

Temporary total disability

Get the actual days lost from temporary total disabilities for the period to be analyzed.

2. Other time charge

Obtain permanent disability time charges for this period. See handout "Calculate the Injury - Severity Rate."

3. Total

Add the days lost and time charges for the period to be analyzed.

4. Obtain man-hours worked

Obtain actual hours worked or estimate (same as for frequency).

5. Calculate - using formula

$$S = \frac{\text{Total Days Lost X } 1{,}000{,}000}{\text{man-hours worked}}$$

Example: For year - 48 disabling injuries (45 temporary total = 180 days) (3 permanent disabilities)

		Time charge
1 death	=	6,000 days
1 lost eye	=	1,800 days
1 lost end of toe	=	150 days
Temporary total	=	180 days
Permanent disability	=	7,950 days
Total		8,130 days
Man hours		1,010,000

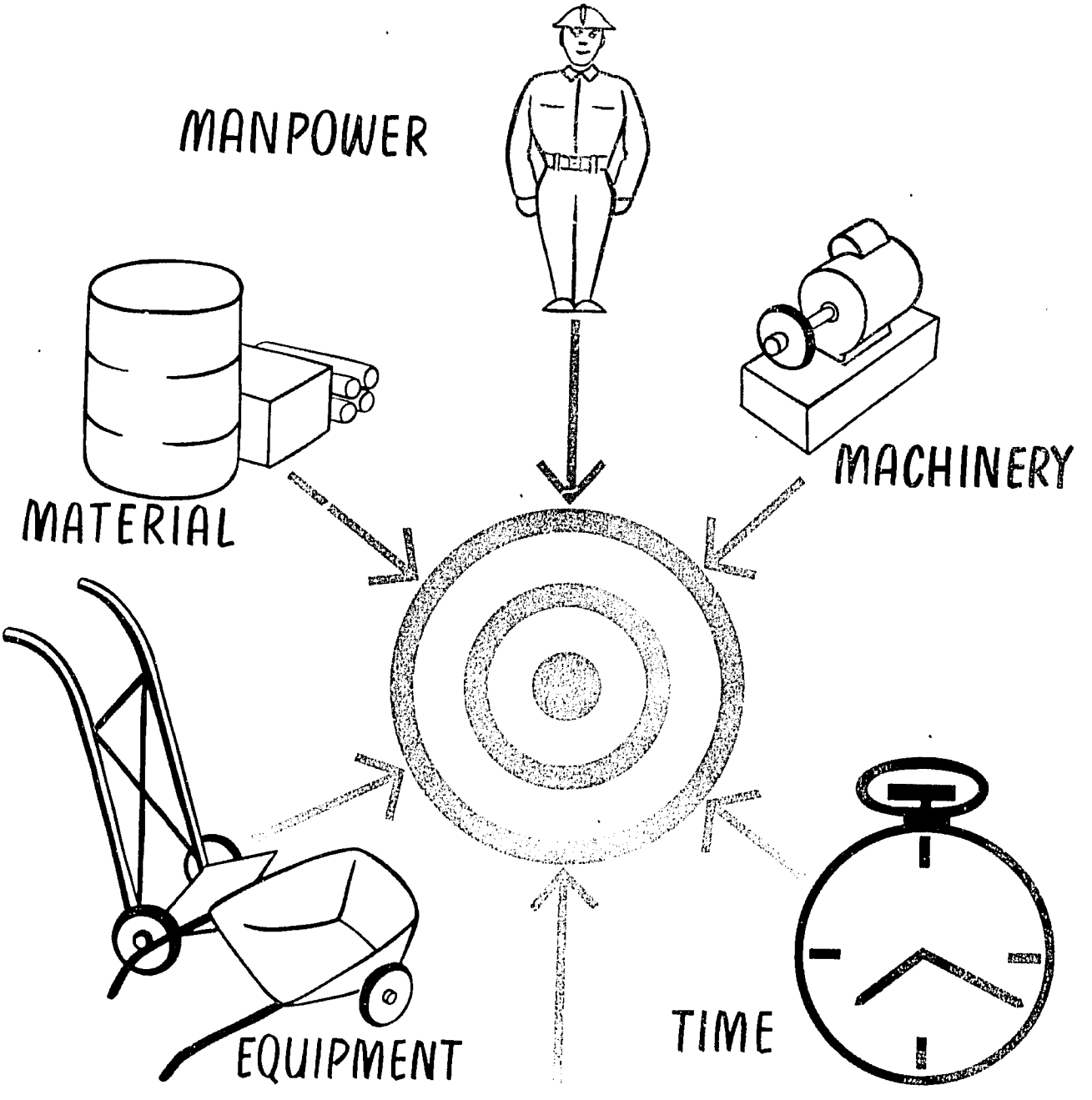
6. Calculation

$$\frac{8{,}130 \text{ X } 1{,}000{,}000}{1{,}010{,}000} = 8{,}049.5$$

8,049.5 - lost days from injuries per 1,000,000 worker hours.

Note:	Take actual examples from class and calculate with them using boards.

SAFETY ORGANIZATION



COORDINATE
SAFETY & PRODUCTION

Chart No. 14

SESSION V

SAFETY ORGANIZATION

Note: Develop purpose with class and board answers.

A. Purpose of Safety Organization

1. To Coordinate Safety — Safety is not a separate function. It is an integral part of production and should be recognized as such.

Safety Organization
Chart No. 14

B. Tools of Production are men - material - machinery - equipment and time.

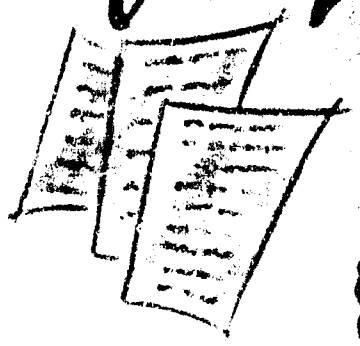
1. Men — These are the most important. Greatest portion of cost and fluctuation of production. Control and operate machinery and material.
2. Material — Raw and semi-processed material used in production to finished product.
3. Machinery — Machines, tools used to process material.
4. Equipment — Electrical - tables - chairs - lighting - ventilation.
5. Time — Production time of A, B, C, D.

Note: Here discuss foregoing and get agreement that

C. Control of damage — Requires organized efforts. Damage to men, material, machinery, equipment and

ORGANIZING for Safety

1. Get Facts



2. Establish Committee

3. Engineer

4. Instruct

Set an Example

Chart No. 15

time, interferes with orderly flow of production and increases costs. Many problems are concerned directly with material flow, demand organized methods of approach.

Note:	Bring out here that the way to prevent accidents is cooperation of everyone.

First: To enlist cooperation of personnel.

By presenting methods, programs and inspiration for attaining the goal of reduction in accidents and injuries.

D. <u>The Supervisor and Safety Organizations</u>

Where the supervisor fits into the organization and what he does.

Organizing for Safety
Chart No. 15

1. Get Facts
2. Establish Committee
3. Engineer
4. Instruct

Note:	Discuss above with class and board answer under each heading.

E. <u>Getting the Facts</u>

1. Reports

First: "look at the record," get all the accident reports and check them and read over all information obtained in investigation of accidents.

2. Survey

Second: Look through the plant to <u>see</u> the situation and to identify hazards for action. Look for a common element - a pattern i.e., the most frequent area, machine, worker, tool, operation, etc.

F. <u>Establish Committees</u>

Bring out that there are two separate <u>types</u> of committees. 1. Policy making and operations guide.

1. Top Supervisory

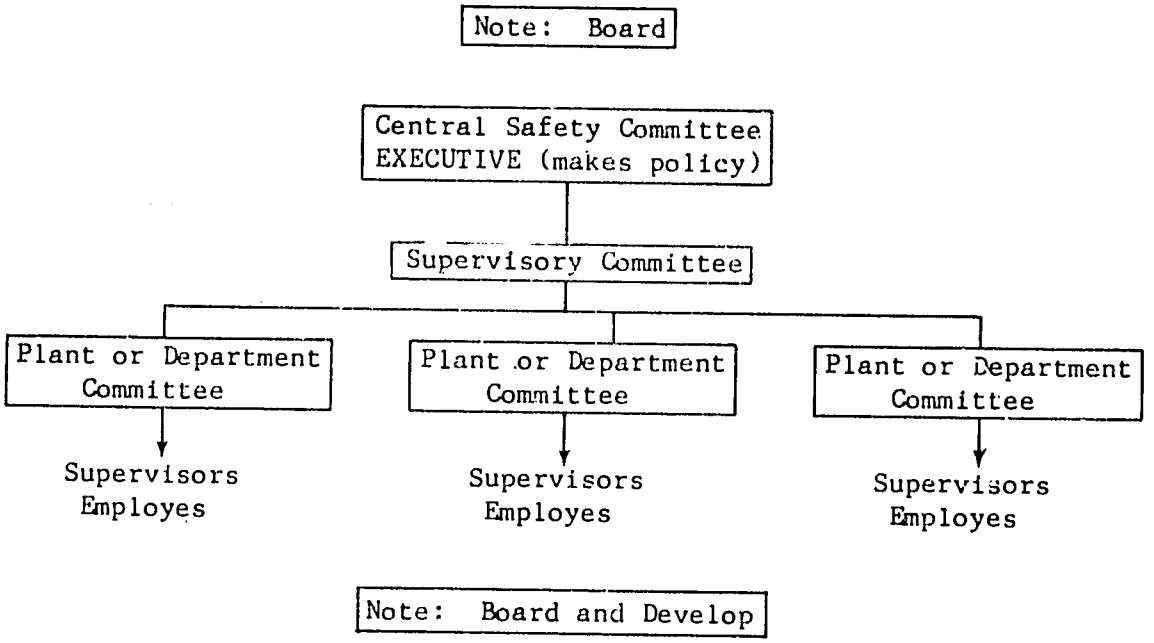
This is top supervisory group, or "Supervisory Safety Committee".

2. Shop

2. Action or advisory guide. This is the committee which does the job--generally referred to as the "Shop Committee", or "Safety Committee", commonly composed of foremen or foremen and workers.

Note: Stress

The name is not important. It <u>is</u> important to provide channels for a <u>two-way</u> interchange of information and a clear understanding between top executives and workers of the aims and objectives in a program for prevention of accidents.



G. Setting up Committees

1. Supervisory

a. Personnel

A supervisory safety committee should be composed of supervisors of about the same level of authority. They should each serve 3 months to 1 year as a committee member and rotate. In order to:

b. Rotate

1. Provide stimulation through participation.
2. Provide indirect training and keep foremen "Up to date",--will help to provide top level leadership.

c. Take Action

This committee has as its duties and responsibilities the recommending of the plant safety program and policies to top management. They should be authorized to take action on recommendations of the shop safety committee.

2. Shop Committee

a. Personnel

Shop committees are generally composed of 3 to 5 workers and foremen (who have already been "sold" on the value of safety). The members selected for the first shop committee are very important to the success or failure of the program. No shop program should be established until management is willing to approve reasonable and practical suggestions made by this committee for the improvement of working conditions or to explain why such suggestions or recommendations cannot be done at the time. When management has shown by its actions and example that it is truly interested in correcting conditions to make a safer plant, the workers on such a committee can "sell" safe practices to the workers.

b. Enthusiasm

Enthusiasm is very necessary for the success of this program and management's backing and attitude is very necessary to bolster the feeling of actual participation by the workers. The cooperation of the committee and the workers is invaluable to the supervisors in "selling safety."

c. Rotation

The members of the committee should be singly rotated at 3 to 6 month intervals

(i.e., one a month for example). This will provide a broader work knowledge and a feeling of participation by the workers.

d. Scope

The scope of activities of the shop committee should be completely understood by all before it tries to function. The following must be clarified:

e. Authority

Authority: None, except through committee, i.e No member of a committee may usurp the authority of the foreman.

f. Inspect

Inspect: Periodic check of property, machines, etc., for hazards of fire or accident or to health of workers.

g. Investigate

Investigate: Accidents, and report findings and discuss and make recommendations for prevention in the future.

h. Training

Training: Direct and indirect, and new worker orientation and training.

Sell Safety: - all of the time

i. Attendance

Attend Meetings: Attend meetings and participate (during working hours). The committee should have a detailed guide to go by. Outlining duties of the committee and scope of their activities.

Note: Be sure all questions are answered before proceeding.

TYPES OF SAFETY ORGANIZATION

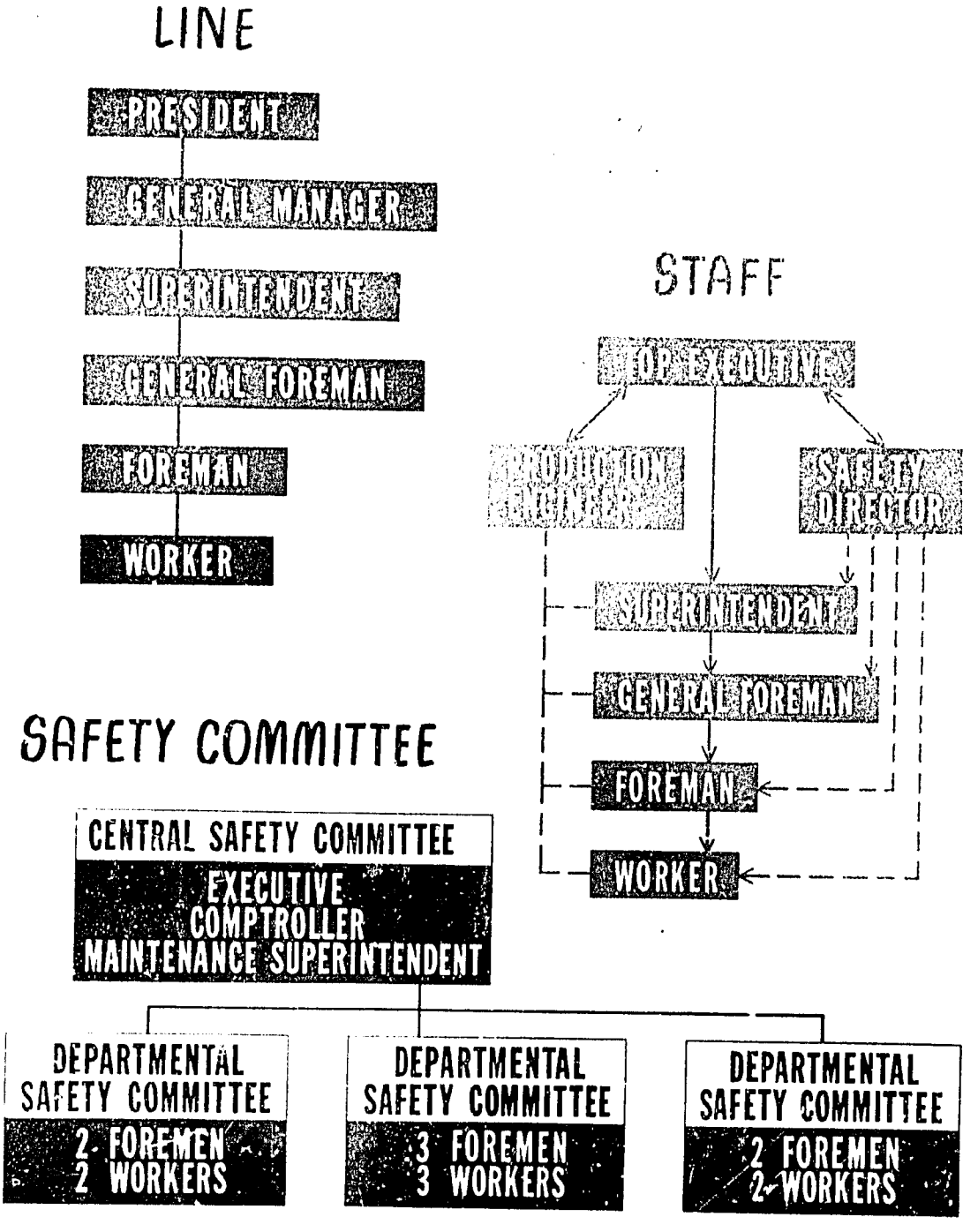


Chart No. 16

H. Engineer

Making job safe, machines, tools, equipment, environment. Assure Safe Conditions.

I. Instruct

Ideas for getting safety across and maintain interest in improving Safe Actions--setting a good example and cooperation.

Note: Note: Add to Board.

J. Summary

A balanced program requires:

Facts

Organization

Cooperation of all

Safe Job

Safe Work Methods

Note: This list can go on for quite a while.

The supervisor is the key-man in this program.

"You can cause success or failure of the Safety Program."

K. Types of Plant Safety Organizations

Types of Safety Organizations

Chart No. 16

Note: Using Industrial Safety Leader's Guide Series B-P 22, quickly discuss types of Organizations with class.

1. Line Organization
2. Staff Organization
3. Safety Committee

BALANCED SAFETY ORGANIZATION

EXECUTIVE SUPPORT

DEFINED RESPONSIBILITY

CAPABLE SAFETY DIRECTOR

GOOD RECORD SYSTEM

SAFETY COMMITTEE

TRAINING

INSPECTION

CORRECT UNSAFE CONDITIONS

DISPENSARY

ENGINEERING REVISION

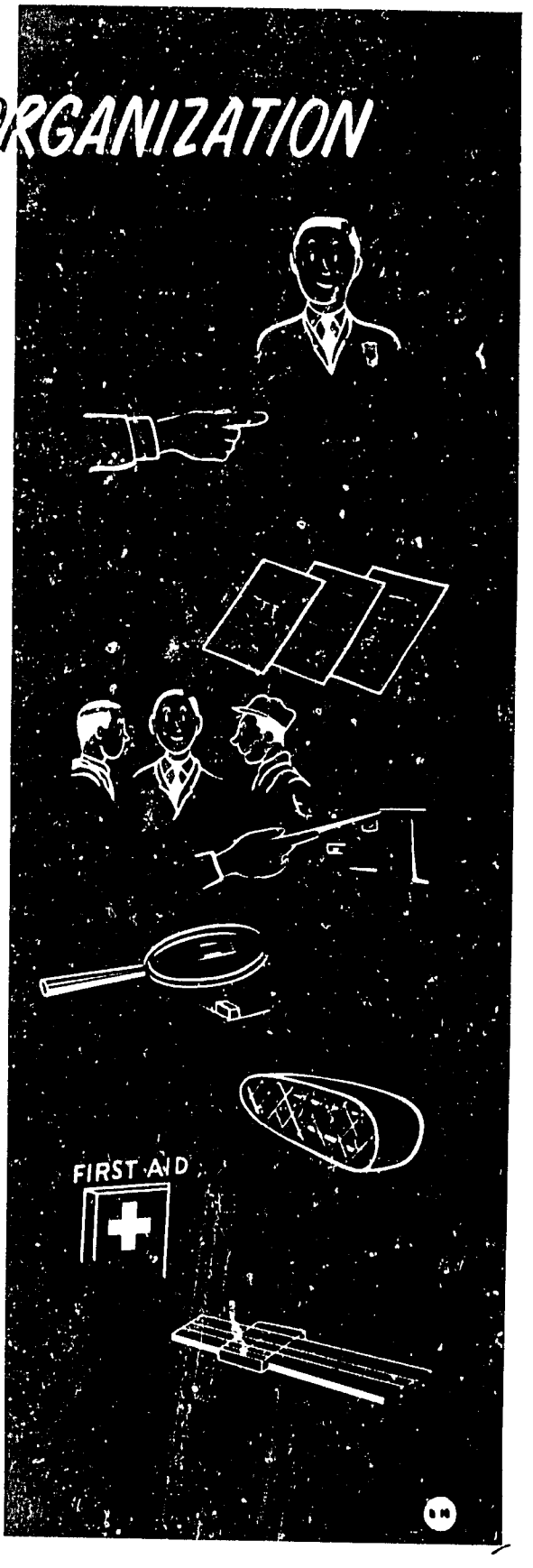


Chart No. 17

L. Balanced Safety Organization

Balanced Safety Organization

Chart No. 17

> Note: Using Industrial Safety Leaders Guide Series B-P 24-26, quickly discuss a balanced Safety Organization with class.

1. Executive Support
2. Defined Responsibility
3. Capable Safety Director
4. Good Record System
5. Safety Committee
6. Training
7. Inspection
8. Correction of Unsafe Conditions
9. Dispensary
10. Engineering Revision

> Note: During this discussion indicate where the supervisor fits into the program.

> Note: Make closing comments--distribute certificates or have an official speak to group and distribute certificates.

APPENDIX

SUPPLEMENTAL PARTICIPANT HANDOUT MATERIAL

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Bureau of Labor Standards
Washington 25, D. C.

9/25/59

" WHAT WOULD YOU DO?"

An otherwise good all-round machinist in the machine shop was laid up for 2 weeks following the removal of a sliver of steel from his left eye. Upon investigation, it was determined that at the time of the accident he was "touching up a tool" at the emery wheel. He was not wearing goggles at the time although he, as well as all men in the machine shop, had been provided with a pair of safety glasses. Further, there was a shop rule that the goggles should be worn whenever grinding or machining metal. A check of the first aid records disclosed that the worker had made five trips to the first aid room during the past 12 months for the removal of foreign bodies. No time, however, had been lost. When the foreman was asked why he had not enforced the rule on eye protection, he stated, "I just can't watch everyone around here." Upon return to the shop the injured man was asked if he didn't know about the eye protection rule and why he didn't wear his safety glasses. The worker replied, "I was only doing a quick job and didn't think goggles were needed. It was a low carbon steel and very few sparks fly from that stuff. Besides, it was just an accident and could happen to anybody."

If <u>you</u> were the foreman what would you do? Check the one most important action you would apply. (Assume policy would permit.)

- ☐ Fire the man for refusal to obey the rule and as an example to others.
- ☐ Put a sign on the grinder "Eye Protection MUST be worn when operating this machine."
- ☐ Hold all the men in the shop for 15 minutes after quitting time and give a talk on eye protection.
- ☐ Put up some posters on eye protection.
- ☐ Get a glass eye and show it around among the men.
- ☐ Call all the men together with the worker in question and review the accident.
- ☐ Make the worker a member of the shop safety committee.
- ☐ Offer an incentive to each worker who goes for one year without a lost-time injury.
- ☐ Get the plant nurse to "sell" the need for eye protection each time a worker comes in for removal of a foreign body.
- ☐ Put on a demonstration of goggles, showing strength of lenses, optical clarity, adjustability of frames, etc., (on company time).
- ☐ Write up tough shop safety rules to hand out on the next shift.
- ☐ Other.

ACCIDENT SEQUENCE

INJURY

1. Cuts
2. Burns
3. Bruises
4. Splinters
5. Broken bones
6. Sprains and strains
7. Infections
8. Concussions
9. Shock
10. Punctures
11. Dermatitis
12. Eye Injuries

1. Damage to machine, material and equipment

ACCIDENT

1. Falls
2. Contact with
3. Striking against
4. Caught between
5. Struck by
6. Exposure to:
   - Heat (extreme)
   - Irritants
   - Fumes
7. Slips
8. Over-exertion
9. Inhalation and absorption of dangerous chemicals

UNSAFE CONDITION

1. Improper guarding
2. Defective equipment
3. Hazardous arrangement
4. Poor lighting
5. Poor ventilation
6. Poor housekeeping
7. Unguarded

UNSAFE ACTS

1. Failure to use safety equipment
2. Operating without authority
3. Working at unsafe speed
4. Making safety devices inoperative
5. Using unsafe equipment
6. Using equipment unsafely
7. Unsafe loading and mixing
8. Taking unsafe position
9. Repairing moving equipment
10. Running and horseplay

PERSONAL FAULT

1. Lack of knowledge
2. Improper attitude
3. Physical or mentally handicapped

Corrections for above:

1. Instruction
2. Discipline
3. Placement

To prevent accident and injuries, eliminate unsafe acts and unsafe conditions

OCCUPATIONAL SAFETY AID
ACCIDENT CAUSES

Many people confuse the terms Source and Cause in relation to accidents. The difference, once understood, will help in accident reporting, investigation, and in prevention programming.

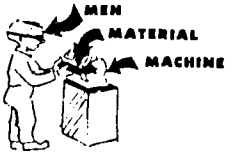
The "Source" is always the type of work being done, or activity. Some examples are: handling materials, using hand tools, operating machinery.

The "Cause" is either an unsafe condition, an unsafe act of a person, or a combination of the two.

Falls, burns, eye injuries - are the results of accidents and do not belong in the other two classifications.

An accepted definition of an Accident is: Any unexpected or unforeseen occurrence that interrupts or interferes with the orderly progress of the activity in question.

The three "M's" usually involved are:



Any one, or any combination, or all three may be involved.

also:

An accident may result in

---

a. Damage to a machine or material.
b. Injury to the worker or another person.

Accidents increase cost when interruptions, interferences, or damage are the result.

Accidents do not always result in injury. To prevent injuries you must prevent accidents. Accidents which do not result in injury are seldom reported. Corrective or preventive measures cannot be taken if the accidents are not reported.

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Bureau of Labor Standards

Preceding the injury is an occurrence. Preceding the occurrence there is in every case, either: an unsafe act of a person, or an unsafe physical or mechanical condition.

Causative factors - Careful thought will make it clear that two basic factors exist in every case of accidental injury: the hazard and faulty behavior. Since neither the factor of hazard nor faulty behavior can be completely eliminated, the only thing to do is to reduce the hazard factor while developing and maintaining behavior as nearly faultless as possible.

Uncovering Mechanical Causes - Sometimes the wrong act stands out because of the injury that results, while the correctible hazard escapes notice. As a result, a factor of uncertainty exists because too many injury reports are not based on adequate investigation of causes.

Accident Factors - For accident-prevention purposes there are six kinds of information which we need to know about every accident. These are called the "accident factors," which is another way of saying "important or essential facts." They are distinguished from all the other facts about the accident which help describe what happened, but which are not essential for accident prevention. These factors are given these special names:

1. THE AGENCY
2. THE AGENCY PART
3. THE UNSAFE MECHANICAL OR PHYSICAL CONDITION
4. THE ACCIDENT TYPE
5. THE UNSAFE ACT
6. THE UNSAFE PERSONAL FACTOR

THE AGENCY is the defective object or substance most closely related to injury that could have been:

a. Properly guarded
b. Corrected - such as machines (lathe, punch press, saw, drill press)

THE AGENCY PART is the particular part of the agency most closely associated with the injury that could have been guarded or corrected. On a drill press it might be: the chuck, drill, table, spindle, belt, or gears.

THE UNSAFE MECHANICAL OR PHYSICAL CONDITION is the condition of the agency which could have been guarded or corrected. For example, defective condition (rough, sharp, slippery, inferior in construction); hazardous arrangement or procedure (unsafe storage, congestion, overloading, improper illumination).

THE ACCIDENT TYPE is the manner of contact of the injured person with the object or substance, or the exposure or movement of the injured person which resulted in injury.

THE UNSAFE ACT is the violation of a commonly accepted safe procedure which caused the accident type.

THE UNSAFE PERSONAL FACTOR is the mental or bodily characteristic which permits or occasions the unsafe act.

There are three types of PERSONAL FACTORS:

1. IMPROPER ATTITUDE

Disregard of instructions, failure to understand instructions, nervousness, excitability

2. LACK OF KNOWLEDGE OR SKILL

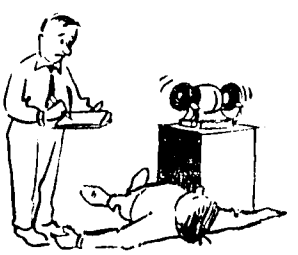
Unaware of safe practices, unskilled.

3. PHYSICAL IMPAIRMENT

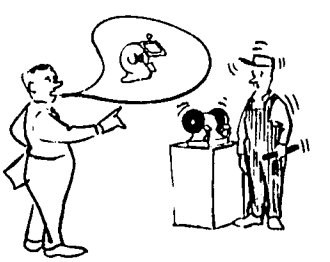
Includes defective eyesight, hearing.

To determine accident Causes, the above three factors are of major importance in determining cause. They occur in a given sequence to produce the final result.

There are two ways of using accident-cause analysis for preventive action.

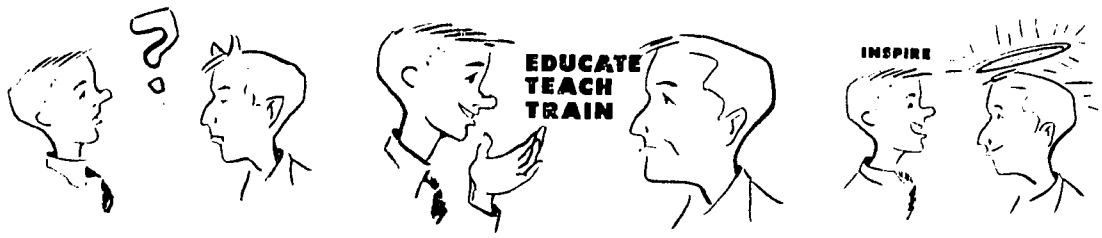


- OR -



One is to record all accident cases, indicating the applicable "accident factors" involved. The better method is to use the "factors" as guides in analyzing working conditions and methods to determine exactly where and how accidents might happen so that preventive measures can be taken. This latter procedure requires determination of each specific "Agency" and "Agency Part" so that the "Unsafe Mechanical or Physical Condition" which exists, or might exist, may be pin-pointed. Further study should reveal the "Accident Type" which could result. The corrective or preventive measures necessary would then be obvious.

Preventing "Unsafe Acts" of persons is more difficult because of the many variations of human behavior involved.



Through training, education, and inspiration a "proper attitude" may be developed, and workers can be given the "knowledge and skill" necessary to do their work safely. In addition, supervision must exert the required discipline to make certain that the safe work methods are followed. Assigning a worker to the job for which he is physically capable modifies the factor of "physical impairment" as a reason for committing an unsafe act.

Determining accident causes requires consideration of all of the contributing factors. Preventing accidents requires elimination of these causes.

For further details on accident factors, refer to the American Safety Standard Z16.2, 1941, "Compiling Industrial Accident Causes" available from the American Standards Association, 10 East 40th Street, New York 16, New York.

ACCIDENT CAUSE ANALYSIS

Accident Case

William Smith, needing a ladder to reach smoking bearing, noticed a 20 ft. straight ladder in a corner of the shop. He first cut off power on overhead line shaft--then placed the ladder against shaft. With a lubricating gun in one hand he climbed to sixth rung and oiled the bearing. Deciding that the next bearing a few feet away should also be checked, he placed the gun on a hanger, climbed down ladder and moved it over about four feet. Again climbing up to the shaft, he then reached out to secure gun for next oiling. While in this position, with all his weight on one leg, the ladder rung broke; bottom of ladder kicked out; Smith fell to concrete floor, suffering head injuries.

Investigation showed that:

The shop floor was moderately greasy and ladder was not equipped with safety feet. Ladder had been in service six years and was painted with several coats of paint.

No particular department had responsibility for ladder maintenance and no schedule for ladder inspection was followed. There were no specific rules covering the use of ladder. The foreman said he felt that the experienced employees knew how to use ladders and had given no specific instruction on the use of ladders. He also stated that injured worker was experienced and had a good past safety record.

U.S. DEPARTMENT OF LABOR
Bureau of Labor Standards
Division of Safety

HOW TO INVESTIGATE ACCIDENTS

PURPOSE OF ACCIDENT INVESTIGATION

To obtain information through which recommendations for corrective action can be developed for the prevention of similar, or other accidents, either in the area affected or elsewhere in the organization. This is done by:

Determining accident causes	Seeking out the elements and sources from which the accident developed.
Determining corrective measures	Analyzing the cause factors and making recommendations for their elimination.
Developing educational materials	Producing information which will guide personnel into developing a "Safety Consciousness" and knowledge of safe conditions and safe work methods.

WHICH ACCIDENTS SHOULD BE INVESTIGATED?

All accidents are potentially serious. All are important regardless of the degree of seriousness of any resulting injury, since the "injury-result" of any set of accident-producing circumstances is impossible to predict.

EVERY accident should be properly investigated, bearing in mind the following order of importance:

1. Deaths, or other catastrophes.
2. Permanent disabilities.
3. Temporary disabilities.

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WHEN SHOULD ACCIDENT INVESTIGATIONS BE MADE?

As soon as possible after the accident.

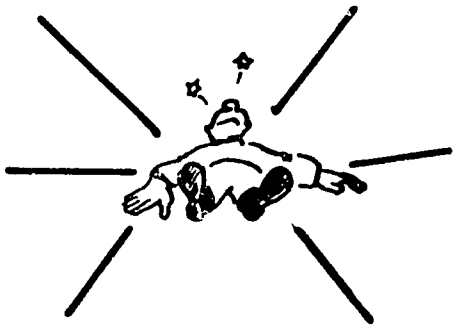
Delays—even those of only a few hours—can permit information or items of importance to be removed, destroyed, or forgotten.

SIX QUESTIONS TO ANSWER AS THE BASIS OF ACCIDENT INVESTIGATION

HOW
did the accident happen?

WHO
was injured?

WHERE
did it happen?



WHEN
did it happen?

WHAT
were the materials, machines, equipment, or conditions involved?

WHY
did it occur?

WHAT SPECIFIC INFORMATION SHOULD BE OBTAINED?

OCCUPATION	What work was injured doing?
SEX	State whether male or female.
AGE	Exact if possible; otherwise approximate.
DATE	Show day—and hour—of occurrence.
PLACE	Give the specific location.
TYPE	What type accident—fall, struck by, caught in, burned?
EQUIPMENT	What materials, machines involved?

IN ADDITION to these fundamental and basic points, the following items should receive appropriate attention, depending upon the circumstances in each case:

DESCRIPTIONS BY WITNESSES

Get various accounts of the accident—the worker's, his supervisor's, and other witnesses.

UNSAFE CONDITIONS

State what unsafe condition contributed to the accident. Give reasons for its existence, if possible.

UNSAFE ACTS

List any unsafe acts involved. Why did they occur—lack of skill, poor attitude, misunderstanding?

CORRECTIVE ACTION

What has been done to prevent recurrence of the accident?

BRING OUT ALL THE FACTS

1. **DESCRIPTIONS BY WITNESSES**
2. **UNSAFE CONDITIONS**
3. **UNSAFE ACTS**
4. **CORRECTIVE ACTION**

OTHER INFORMATION

You can't get too much information about an accident. What may appear to have been a simple accident, may have contributing circumstances which are quite involved. Underlying causes must be sought.

A report that a worker "got a particle in his eye," or that "he was not wearing his goggles," gives no clue as to how or why the accident happened. Determine where the particle came from, and how. Why wasn't the worker wearing his goggles? Get the whole story.

Never say a worker was "careless." This is an effect, not a cause. If you think he was careless, find out why—there always is a reason.

WHO SHOULD INVESTIGATE?

The person, or persons, making the investigation should have some knowledge of accident sources and causes, the work processes, and equipment or machines involved

Depending upon the circumstances, one or more of the following people should make the investigation:

The immediate supervisor(s) of the injured person.

A representative of the Safety Department.

A member of the Safety Committee; or subcommittee for accident investigation, if there is one.

Insurance company safety engineer.

PRINCIPLES WHICH SHOULD BE OBSERVED

1. USE COMMON SENSE–Stick to the facts, weigh their value, reach justified conclusions.

2. INVESTIGATE EACH CLUE–An apparently reasonable conclusion will often be changed by exploring factors which may not appear to be important.

3. CHECK FOR UNSAFE CONDITIONS AND ACTS–Both are present in the great majority of accidents.

4. MAKE RECOMMENDATIONS–No investigation is complete unless corrective action is suggested.

5. INVESTIGATE ALL ACCIDENTS–Chance is often the sole difference between a trivial accident and a serious one. Results cannot be predicted.

6. PREPARE REPORT–Written reports are helpful tools for study and analysis, to determine specific areas or operations in which accidents are occurring, and for followup action on recommendations.

ACCIDENT COST CONTROL

The need for an improvement of accident cost control systems has been recognized for many years in the U.S.A. Many managements have a sincere humanitarian interest in their employees and their families. They, therefore, allocate some money towards the prevention of accidents without expecting a fair return for their investment. We might point out that "experience rating," which permits insurance companies to reduce workmen's compensation premiums for companies having safety programs and showing a reduction in the number of accidents has an important factor in the allocation of funds by industrial management for safety prevention programs. Despite this favorable position of the safety department, it cannot afford to neglect the effect of its activities on production and company profits. Compensation has, in many cases, forced management to reduce overhead costs to a point where only such staff departments that show a profitable operation can be supported. It is, therefore, of primary importance that such management is aware of actual production cost reductions resulting from such a program. In other words, a good safety program must prevent lost production and increased costs resulting from accidents.

Direct and Indirect Costs

In 1928, the American Engineering Council published a research report which resulted in the development of the direct and indirect cost concept. The compensation payments, plus the medical expense taken together, were referred to as direct costs. The indirect costs included hidden costs which included:

1. Cost of lost time of injured employee.

2. Cost of time lost by other employees who stop work:

   a. Out of curiosity.

   b. Out of sympathy.

   c. To assist injured employee.

   d. For other reasons.

3. Cost of time lost by foremen, supervisors, or other executives as follows:

   a. Assisting injured employee.

   b. Investigating the cause of the accident.

   c. Arranging for the injured employee's production to be continued by some other employee.

   d. Selecting, training, or breaking in a new employee to replace the injured employee.

   e. Preparing state accident reports, or attending hearings before state officials.

4. Cost of time spent on the case by first aid attendant and hospital department staff when not paid for by the insurance carrier.

5. Cost due to damage to the machine, tools, or other property or to the spoilage of material.

6. Incidental cost due to interference with production, failure to fill orders on time, loss of bonuses, payment of forfeits, and other similar causes.

7. Cost to employer under employee welfare benefit systems.

8. Cost to employer in continuing the wages of the injured employee in full after his return--even though the services of the employee (who is not yet fully recovered) may, for a time, be worth only about half of their normal value.

9. Cost due to the loss of profit on the injured employee's productivity, and on idle machines.

10. Cost that occurs in consequence of the excitement or weakened morale due to the accident.

11. Overhead cost per injured employee - the expense of light, heat, rent, and other such items, which continues while the injured employee is a non-producer.

It was during this same period that 4 to 1 ratio was developed. The ratio was an attempt to indicate that the indirect costs of an accident were at least 4 times as great as the direct cost of a disabling injury. The validity of this ratio has often been questioned. Subsequent studies have yielded ratios as low as 1 to 1 and as high as 20 to 1.

Recently, the terminology was changed from "direct cost and indirect cost" to "insured cost and uninsured cost," because it is felt that the latter is a more definite description of the costs and it also brings management to regard the uninsured costs with more interest. The change in terminology did not affect the content of what constituted "direct costs and indirect costs."

Generally, the feeling by industrial management has been to accept the "direct" or "insured" costs of accidents as the actual cost without regard for the "indirect" or "uninsured" costs. The reason for this reaction was due to the fact that "indirect" or "uninsured" costs were intangible in nature and could not be determined without an extensive amount of research detail. For example, it is difficult to determine the amount of time that supervisors and company executives spend in assisting an injured employee, investigating the accident, arranging for the employee's production to be continued by some other employee, selecting, training, or breaking in a new employee and preparing accident reports. These activities are conducted during the course of carrying out

their job and are integrated to a degree where it is difficult to separate them. This is just one of many items that are included in the "indirect" or "uninsured" accident costs that fall into this category. It was with this problem in mind that a new, simple accident control concept was developed.

Elements of Production Concept

The concept described below has been under consideration in many countries including the U.S.A. and is being applied in some areas of the world. It is felt that this concept can be more successful when put into effect in plants that have an adequate safety and accounting department.

In this concept, we do not concern ourselves with such terminology as "direct costs", "indirect costs", "insured costs" or "uninsured costs", instead we use five basic factors of production which we call the elements of production. They include:

1. Manpower

By manpower, we mean the plant employees including workers, clerks, engineers and other salaried employees. Injuries to these people result in lost production time and compensation and medical costs.

2. Machinery

This includes production machinery, machine tools, auxiliary machinery and hand tools. Accidents result in machine damage requiring repair or replacement which, in turn, results in interruptions to production. This means higher costs and lower quantity and quality production.

3. Material

This includes raw material, goods in process and finished products. Accidents result in damage to material which then requires repair or replacement. This results in production interference and increased costs.

4. Equipment.

This includes the buildings, yards, electrical power, ventilation and lighting equipment, ladders, containers for material in process, tables and chairs and other physical equipment other than machinery that is essential to plant operations. Damages from accidents including fire and explosion result in increased costs and interference with production.

5. Time.

Time includes production time lost because of injuries to employees, damaged machinery, equipment and material.

Every accident damages at least one or more of the elements of production. A decrease in the number of accidents should eventually affect the unit cost of production.

When using the "Elements of Production" concept we are concerned with accident costs as they affect production without any consideration of such terminology as "direct," "indirect," "hidden," "insured" or "uninsured." This concept has been found to be more acceptable to management. It should be recognized that this concept does not include all the items that are listed under "indirect" costs. It does, however, include such costs that are easily recognizable and more acceptable to management.

In order to derive the greatest benefit possible from a good accident ost control program, every accident, whether it results in an injury or not, hould be investigated and reported. The determination as to the practicabilty of investigating all accidents should be made by management after a disussion of this procedure and its possible benefits.

The same form may be used for reporting all accident costs, costs of accidents resulting in disabling and minor injuries or costs of accidents resulting only in disabling injuries.

It might be desirable in some instances to start with the costs of accidents resulting in disabling injuries and as this system is used and greater experience is gained, it could be broadened to eventually include all accident costs.

Accident Cost Program Procedure

There are two key groups that can make this procedure successful or result in failure - they are the supervisor and the accounting office. It is, therefore, extremely important that top management impresses on them the importance of this procedure and its value to the plant.

The supervisor is in the best position to discover and make an immediate investigation of the accident, both for cause and for damage. He should also be instructed to notify the safety department as soon after the accident as possible about its extent and severity.

The accounting office will have to set up a separate record system for determining the cost of repairs and replacement of damaged machinery, material and equipment and the cost of lost production time. This will enable them to complete the form that was originally started by the supervisor. The form should then be submitted to the safety department for final and cumulative tabulation. The safety department can compile the reports for scheduled periods and issue compiled copies to management and each departmental supervisor. Accident costs should be discussed as a regular agenda item during departmental safety committee and central safety committee meetings.

Such an accident cost control procedure will create a greater incentive

for all levels of management and supervision to participate in an accident control program for direct benefits to management and labor. It should assist in putting an accident prevention program in the proper perspective where the production and administration of a plant are concerned.

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ELEMENTS OF PRODUCTION - ACCIDENT COST FORM

Name of Employee Directly Involved_____ Dept._____ Job Title_____

Injury if any_____

When Injured_____ Lost Time_____ First Aid_____ No Injury_____

What was Employee Doing Before Accident_____

_____

_____

What Happened_____

_____

_____

MANPOWER

Returned to Job_____ Compensation Payments ..... _____

Days on Compensation_____ All Medical Expenses ..... _____

TOTAL Compensation and Medical Costs ..... _____

Injured Worker's Wage_____/Hour

Time lost on day of injury_____ Hours_____ Minutes _____

Time lost on subsequent days_____ Hours_____ Minutes _____
(Treatment or other reasons)

Time on light work or
reduced output_____ Days_____ % Output Decreased _____

Wages paid other than compensation during disability ..... _____

Medical costs other than those covered by Compensation Insurance ..... _____

TOTAL MANPOWER COSTS ..... _____

MACHINERY

Damage to Machinery - (Describe)

_____

_____

Cost of Repair or Replacement_____

Lost Production Time_____Cost_____

MATERIAL

Damage to Material - (Describe)

_____

_____

Cost of Repair or Replacement_____

Lost Production Time_____Cost_____

EQUIPMENT

Damage to Equipment - (Describe)

_____

_____

Cost of Repair or Replacement_____

Lost Production Time_____Cost_____

TOTAL COST OF ACCIDENT _____

HOW TO COMPUTE INJURY RATES

(Frequency and Severity Rates)

Injury frequency and severity rates are important because they enable a company or operating unit to determine how effectively its employee injury problem is being met, and what progress is being made.

To accomplish this, a standard method of computing these rates is utilized, which adjusts for differences in size of operating units and other variables. This method is included in Standard Z16.1-1954 of the American Standards Association, entitled "American Standard Method of Recording and Measuring Work Injury Experience." It is universally accepted and used by industry.

Bulletins showing the monthly and annual frequency and severity rates of individual industries are issued periodically by the U.S. Department of Labor's Bureau of Labor Statistics.

INJURY-FREQUENCY RATES

INJURY-FREQUENCY RATES are used to determine:

(1) whether the number of work injuries in any particular operating unit is lesser or greater than in other operating units in the same industry;

(2) whether a given operating unit is having more or less injuries when compared to a previous period of time and similar operations;

(3) whether an industry has a better or worse injury experience than other industries, or than the average for all industries.

For example, let us assume an operating unit had an injury frequency rate of 9.8 disabling injuries per million man-hours worked, for this year. If the frequency was 10.5 last year, and 11.8 the year before, the 9.8 rate this year would indicate the injury experience is improving.

If the average frequency for this industry this year was 10.1, the injury experience of the unit with 9.8 frequency is slightly better than the average for other operating units having similar hazards. However, this industry frequency is an average made up of some units having frequencies much higher than 10.1, and of some other units having frequencies extending considerably below 10.1. In fact some industries have a number of plants which operate at or close to a zero frequency.

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This means that although the unit with the 9.8 frequency is slightly better than the average for the industry, there are still many other units in the industry having similar hazards, that have better frequency rates. Consequently, the injury experience is still not as good as it should be, and the use of better or additional safety measures for further reduction of accidental injury occurrence should be considered.

THE NUMBER OF DISABLING INJURIES and the MAN-HOURS OF EXPOSURE are needed for computing the injury frequency rate.

DEFINITIONS:

The DISABLING injury is a work injury that results in:

A. Death.
B. Permanent Total Disability.
C. Permanent Partial Disability.
D. Temporary Total Disability.

DEATH is any fatality resulting from a work injury, regardless of the time intervening between the injury and death.

A PERMANENT TOTAL DISABILITY is any injury, other than death, which permanently and totally incapacitates an employee from following any gainful occupation, or which results in the loss of, or the complete loss of the use of, any of the following in one accident:

A. Both eyes.
B. One eye and one hand, or arm, or leg, or foot.
C. Any two of the following not on the same limb: hand, arm, foot, or leg.

A PERMANENT PARTIAL DISABILITY is any injury other than death or permanent total disability which results in the complete loss of use of any member or part of a member of the body, or any permanent impairment of functions of the body or part thereof, regardless of any preexisting disability of the injured member or impaired body function.

A TEMPORARY TOTAL DISABILITY is any injury which does not result in death or permanent impairment, but which renders the injured person unable to perform a regularly established job which is open and available to him during the entire time interval corresponding to the hours of his regular shift on any one or more days (including Sundays, days off, or plant shutdowns) subsequent to the date of injury.

A MEDICAL TREATMENT (OR FIRST AID) injury is one which does not result in death, permanent impairment, or temporary total disability, but which requires medical treatment (including first aid).

MAN-HOURS OF EXPOSURE is the total number of employee-hours worked by all employees of the operation involved for the given period of time.

INJURY-FREQUENCY RATE COMPUTATION

First step: GATHER THE INFORMATION

1. Obtain the number of employee-hours of exposure, preferably direct from the time records. When this cannot be done the exposure may be estimated on an annual basis as follows:

> The average employee who works a 40-hour week can be assumed to work a total of 2,000 man-hours per year.
>
> Multiply the number of full-time employees by 2,000.
>
> Estimate the number of hours worked by part-time employees, and the number of hours of overtime.
>
> Add these two figures and you have a fairly accurate estimate of the total annual number of hours in which the employees have been exposed to injury for that year.

2. Obtain the number of Disabling Injuries from the employee injury record. If such a record is not maintained, an estimate may be developed by adding the disabling injury reports and fatalities that have occurred during a period of time covered by the number of man-hours of exposure.

Second step: CALCULATE THE INJURY-FREQUENCY RATE

Use the above information and the following formula to calculate the injury-frequency rate:

$$\text{Injury-Frequency Rate} = \frac{\text{Number of Disabling Injuries} \times 1{,}000{,}000}{\text{Total Number of Man-Hours of Exposure}}$$

EXAMPLE: In one year there were 8 Disabling Injuries and 1,500,000 man-hours worked

$$\text{Injury-Frequency Rate} = \frac{8 \text{ (Disabling Injuries)} \times 1{,}000{,}000}{1{,}500{,}000 \text{ (Man-Hours of Exposure)}}$$

$$\text{or: } \frac{8{,}000{,}000}{1{,}500{,}000} = 5.33$$

Injury-Frequency Rate is 5.33

INJURY-SEVERITY RATE COMPUTATION

The Injury-Severity Rate is a measure of how serious the disabling injuries were as determined by the amount of time lost from the job. Time charges are made for permanent disablements, rather than actual time lost which takes into consideration future inefficiencies due to the disablement.

First step: GATHER THE INFORMATION

1. Obtain the Man-Hours of Exposure by the same method used for computing Injury-Frequency Rates.

2. Obtain total days lost due to injuries, for the corresponding period of Man-Hours Exposure. This figure may be obtained from the employee injury record.

(Note that death and certain kinds of permanently disabling injuries are arbitrarily assigned a specific time charge in number of days regardless of the time the employee actually was absent from the job. See "Scale of Time Charges," (below) and American Standard Z16.1-1954.)

Second step: CALCULATE THE INJURY-SEVERITY RATE

The formula for computing Injury-Severity Rate is as follows:

$$\text{Injury-Severity Rate} = \frac{\text{Total Days Lost, plus time charges} \times 1{,}000{,}000}{\text{Total Number of Man-Hours of Exposure}}$$

Scale of Time Charges (in days)
(From ASA Standard Z16.1-1954)

Death	6,000
Permanent total disability	6,000

Amputation involving all or part of bone	Thumb	Fingers: Index	Middle	Ring	Little	Great toe	Each of other toes
Distal Phalange	300	100	75	60	50	150	35
Middle Phalange		200	150	120	100		75
Proximal Phalange	600	400	300	240	200	300	150
Metacarpal/Metatarsal	900	600	500	450	400	600	350
Hand at the wrist						3,000	
Foot at the ankle						2,400	
Any part of arm above elbow including shoulder joint						4,500	
Any point above the wrist and at or below the elbow						3,600	
Any point above the knee						4,500	
Any point above the ankle and at or below the knee						3,000	

-- Impairment of function --

One eye (loss of sight) regardless of sight in other eye	1,800
Both eyes (loss of sight) in one accident	6,000
One ear (complete industrial loss of hearing) irrespective of hearing in the other ear	600
Both ears (complete industrial loss of hearing) one accident	3,000
Unrepaired hernia	50

For complete details regarding loss of use without amputation see scheduled charges in A.S.A. report Z16.1-1954 available from the American Standards Association, Inc., 10 East 40th Street, New York 17, N. Y.

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FREQUENCY RATE COMPUTATION

1. Plant "A" worked 103,000 hours during the month of January, 95,000 during February and 131,000 during March. The number of disabling injuries totaled 7 for January; 4 for February; and 5 for March. Using the standard formula, compute the cumulative frequency rate for the 3 months.

   Answer_____

2. Plant "B" had 500 employees during the month of July. They worked a total of 108,000 hours for the month. During this month there were 15 first aid cases and 5 disabling injuries. Using the standard formula, compute the frequency rate for the month of July.

   Answer_____

3. Plant "C" has 500 employees working an average of 8 hours per day and there are 20 working days in the month. (a) Find the estimated hours worked. If there were 5 disabling injuries during the month, (b) Compute the frequency rate.

   Answer (a)_____ (b)_____

4. Plant "D" had 625 employees who worked 40 hours a week for 50 weeks during the year. They had 17 disabling injuries. Compute the man-hours and the frequency rate.

   Man Hours_____ Frequency_____

5. Plant "E" had 500 employees throughout the year. The frequency rate for the first six months was 15.0. What was the frequency rate for the year?

   Answer_____

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STUDENT WORK SHEET

INJURY SEVERITY RATE COMPUTATION

1. Plant "A" worked 108,000 man-hours. During this time they had 11 disabling injuries totaling 90 days lost time. Compute the injury severity rate.

   Answer_____

2. The injury severity rate for a plant having 10 injuries causing 200 days lost in 200,000 hours worked would be . . . . .

   Answer_____

3. A plant worked a total of 900,000 hours during a six-month period. During this period it had the following injuries:

15 first aid cases	no days lost
3 permanent partial cases	3,150 days time charged
22 temporary total disabilities	150 days lost

   Find the injury severity rate for the six-month period.

   Answer_____

4. During one year a plant working 40 hours a week had 765 men. The plant had the following injuries:

   16 first aid cases.
   7 temporary totals--64 days lost.
   1 loss of thumb and two fingers, same hand.
   1 loss of hearing, one ear--lost 11 days.
   1 loss of leg, below the knee.

   Compute Injury Severity Rate.

   Answer_____

OCCUPATIONAL SAFETY AID
SAFETY COMMITTEE ACTIVITIES

Safety Committees are valuable tools in every program of accident prevention

WHY A SAFETY COMMITTEE?

Many installations have small, if any, formal safety programs and the value of a safety committee is not recognized. Top management and supervisors are left on their own to sandwich safety in with other activities. A safety committee cannot take away the supervisor's responsibility for safety, but it does help him in his constant effort to prevent accidents.

To reach and maintain first-rate safety performance, the full cooperation of everyone in the organization is needed. The safety committee is one device for obtaining this cooperation.

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VALUE OF A SAFETY COMMITTEE

The safety committee provides the important factor of employee participation in the safety program, tying in the knowledge of workers with the experience of supervisors.

The committee provides a channel for action on suggestions and ideas submitted by employees.

It encourages a closer relationship between management and workers, improving attitudes toward safety and understanding of problems.

The safety committee is an excellent means for maintaining good employee and public relations and for keeping morale on a high plane.

The "on-the-job" experience of the committee members is valuable in determining hazardous conditions and methods of work, suggesting corrective measures and obtaining participation of all personnel.

By its observations, thinking, and discussions the committee provides the stimulation and suggestions necessary to maintain safe conditions and safe workers.

WHAT IS A SAFETY COMMITTEE?

A safety committee is a group of employees appointed to aid and advise management on matters of worker safety. The committee may be composed of top management and two or three supervisors, or a supervisor and several workers, or any other combination of supervisors and workers. It is important that top management be represented and participate in the organization and conduct of the committee meetings.

The chairman should be a supervisor and should be chosen for qualities of leadership, interest in safety, and ability to get results.

As the scope of the safety committee's activities is advisory, management may find it practical to appoint an engineer, supervisor or master mechanic to the committee with authority to correct unsafe conditions without further approval.

Through its activities and reports the safety committee keeps management informed as to the condition of buildings, grounds, and equipment, and as to progress or requirements for increased safety.

The safety committee should hold regular monthly meetings at which the recommendations, accidents, records, and program plans are discussed; AND a monthly inspection should be made of a selected area or areas with special attention being paid to the subject or aim chosen for that month.

TYPES OF SAFETY COMMITTEES

There are several types of safety committees which may be used, depending upon the organizational structure.

1. **Labor-Management Committee**

   This type is prevalent in organizations having union contracts which contain safety clauses that designate the joint acceptance of responsibility, and the specific activities of labor and management. Union members on this committee are appointed by the union.

2. Non-Union-Management Committee

Where there is no union agreement, or where the contract contains no safety clause, the safety committee functions directly under the policies established by management. While management may appoint union members to this committee, there is no requirement to this effect.

3. Management Supervisors Committee

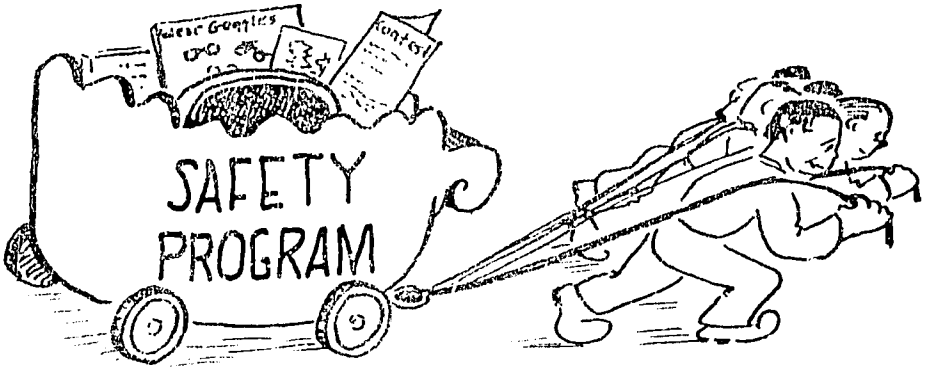
Some management safety committees are made up entirely of supervisory personnel. In many cases, this committee supplements the activities of the committee which includes workers.

4. Technical Committee

This type committee is useful on specific problems or activities for which specialized knowledge is needed. Problems requiring engineering revision, controls or guard design, or relating to special processes or sciences are often handled by such a committee of engineers, safety engineer, chief electrician, master mechanic, and others.

5. Special Committees

Special committees may be set up for specific activities such as safety contests, safety celebrations or awards, accident investigations, and off-the-job safety campaigns. Usually, this committee is dismissed on completion of the project.



WHAT THE SAFETY COMMITTEE DOES

The successful safety committee helps plan the safety program and takes part in making the program operate. These activities will be determined by the size of the committee and the policies set out by the establishment's management and the group. It has been found advisable to establish definite policies when the committee is organized. These should include some or all of the following:

1. **Establish procedures for handling suggestions and recommendations of the committee.**

The success of the safety committee depends to a great extent upon the means provided for complying with or rejecting suggestions and recommendations, and the subsequent follow-up. A step-by-step procedure for handling recommendations should follow a definite pattern, such as:

a. Recommendations submitted to committee by workers or committee members.

b. Discussion and acceptance, modification, or rejection by committee.

c. Accepted recommendation submitted to top management.

d. Written reply to committee from management.

e. Result reported to originator of recommendation.

f. Final report to committee on completion of recommendation.

2. Conduct regularly scheduled meetings for the purpose of discussing accident prevention methods, safety promotion, items noted on inspections, injury records, and other pertinent subjects.

3. Inspect, each month, a selected area or areas of the establishment for the purpose of discovering accident sources and hazards.

4. Investigate accidents for the recommendation of means of preventing recurrence.

5. Provide information to foremen in regard to safe working methods and practices.

6. Recommend changes or additions to protective equipment or devices for the elimination or control of hazards.

7. Develop or revise safe practices and rules to comply with current needs.

8. Promote safety and first aid training for committee members and workers.

9. Participate in "advertising" and in "selling" safety to the workers.

AN EFFECTIVE, SIMPLE ORDER OF BUSINESS FOR SAFETY COMMITTEE MEETINGS HELPS TO MAKE THE MEETINGS PRODUCTIVE AND EFFICIENT:

OLD BUSINESS -

Items not completed in previous meetings
Status of action on previous recommendations

NEW BUSINESS -

Recommendations
Reports of injuries since last meeting
Inspection report
Current injury rates
Training schedules

DISCUSSION -

Monthly subject or theme
Plans for promoting theme

BALANCED RESPONSIBILITY

An efficient, smoothly operating safety committee is one in which management and employees are in agreement as to the responsibilities of each, and makes every effort to carry out such responsibilities. The following guide to such responsibilities is extracted from a list of specific safety clauses included in some union contracts. These items could apply to most types of safety committees.

Management Rights and Responsibilities in the Safety Program:

1. Management to maintain safe working conditions
2. Management to comply with safety laws and regulations
3. Management to install or furnish safety devices
4. Management to provide protective wearing apparel at no cost to employee.

Employee Rights and Responsibilities in the Safety Program:

1. Employees to observe safety rules
2. Employees may refuse to work on unusually hazardous jobs
3. Employees to bear some or all costs of safety apparel
4. Duty of employees to report all unsafe conditions.

AN EFFECTIVE SAFETY COMMITTEE DEPENDS ON -

Sincerity and Interest

Both management and employee members must be sincere, cooperative, and intent on the mission of maintaining safe working conditions and methods. Passive, inactive members are a detriment to e committee and if they cannot be inspired, the committee activities would be improved by their replacement.

Adhering to Schedules of Meetings and Inspections

Skipping meetings indicates that they are not important or that there is not sufficient business for a productive meeting or inspection. If meetings or safety inspections seem to be unnecessary it is evident that the program needs revision.

Action on Recommendations and Suggestions

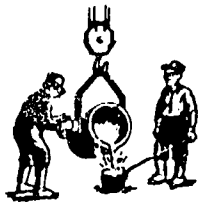
Maintaining interest and support of employees requires that immediate consideration and action be taken on all suggestions.

Records of Injuries and Rates

A current record should be kept of all injuries and monthly injury frequency rates for discussion, action, and determination of accomplishments or areas needing further attention.

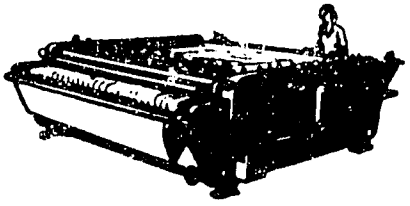
Recognition of Accomplishments

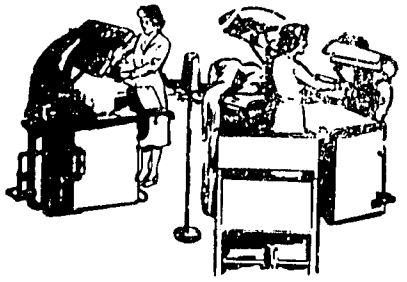
The safety committee, as well as all employees, should be advised of the status of the safety program, and congratulated or otherwise rewarded for superior accomplishments.

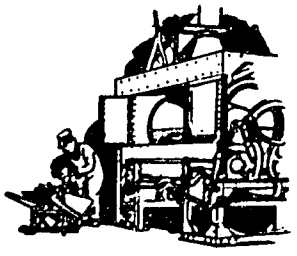


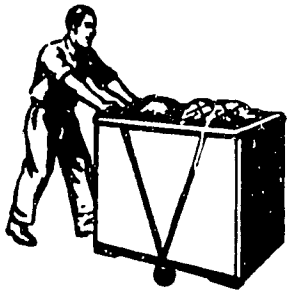
ELEMENTS OF A SAFETY PROGRAM

OCCUPATIONAL SAFETY AID









U. S. DEPARTMENT OF LABOR
Bureau of Labor Standards
Washington 25, D. C.

SUMMARY CHART SHOWING ELEMENTS OF A SAFETY PROGRAM RELATING TO-

MANAGEMENT	WORKPLACE	EMPLOYEE
1. Establish Safety Policy 2. Provide Safe Environment 3. Provide Competent Supervision 4. Delegate Responsibility 5. Provide Training—Education 6. Provide for Safety Inspections 7. Investigate Accidents 8. Measure Safety Performance 9. Maintain Records 10. Provide Continuing Support	1. Eliminate Mechanical and Physical Hazards a. Guarding Machinery b. Maintaining Good Housekeeping c. Safe Materials Handling Methods d. Maintenance of Tools and Equipment e. Grounding and Controlling Electricity f. Safe Working Surfaces 2. Eliminating Environmental and Chemical Hazards a. Providing Personal Protective Clothing and Equipment b. Controlling Air Contaminants c. Controlling Temperature and Humidity d. Controlling Toxic Substances and Chemicals e. Adequate Illumination f. Noise Control	1. Selection 2. Placement 3. Training 4. Supervision 5. Stimulate Interest a. Safety Committee b. Incentives c. Visual Aids

ELEMENTS OF A SAFETY PROGRAM

Safety Is Good Business

SAFETY IS AN OPERATIONAL FUNCTION

AN ACCIDENT IS AN OPERATIONAL FAILURE

A profitable business depends on such factors as:

1. Skillful planning
2. Maximum production
3. Minimum cost
4. Quality control
5. Morale of personnel
6. General efficiency

The tools of a profitable business are:

1. **Men**
2. **Machines**
3. **Materials**

When accidents or injuries occur to these tools every one of the segments of the operation suffers and is affected.

Therefore, accident prevention is not something separate or additional to the regular job but is the combination of safe conditions and equipment and safe work procedures interwoven into every phase of the operation.

Causes of Accidents

CONTROL
UNSAFE CONDITIONS
UNSAFE ACTS

STOP
ACCIDENTS

Ninety-eight percent of all accidents and injuries are caused by unsafe working conditions, unsafe acts of personnel or a combination of both. Only about 2 percent of the accidents are attributed to acts of God which we can do nothing about.

An unsafe condition is created by improper control of the physical, mechanical, and environmental exposures of the workplace.

An unsafe act is a violation of an accepted work practice or method.

Careful control of conditions and acts will prevent accidents and injuries and improve operational efficiency.

Accident Costs

IF YOU CAN'T AFFORD SAFETY, YOU CAN'T AFFORD TO BE IN BUSINESS

The costs of accidents fall into two categories:

1. Insured costs
2. Uninsured costs

Insured costs include:

a. Medical costs
b. Compensation costs

Uninsured costs include:

a. Lost production time of injured worker getting first aid or medical care.
b. Costs of time spent investigating and reporting injuries, handling injured worker.
c. Costs of hiring and training replacements for injured worker.
d. Interruptions and delays caused by accidents.
e. Damage to machines and materials by accidents.
f. Other indirect inefficiencies and hindrances.

It has been estimated by reliable sources that uninsured costs are usually several times the insured costs. Therefore, the amount paid out for workmen's compensation insurance is only a small part of the total cost of accidents even though this is the most obvious direct outlay of money.

Preventing accidents pays doubly by reducing workmen's compensation insurance premiums and by reducing all the uninsured costs as well.

Responsibility

FIX THE RESPONSIBILITY

Good control of anything requires that responsibility and authority be placed in someone. Safety responsibilities should be placed and accepted as follows:

Management:

1. State and enforce a policy on safety.
2. Provide a safe workplace and work environment.
3. Prescribe safe work practices and procedures.
4. Provide adequate training and competent supervisors.
5. Designate responsibility and delegate authority to supervision.

Supervisor:

1. Train personnel in proper work practices.
2. See that proper practices are followed.
3. Investigate all injuries for causes.
4. Take corrective action when unsafe conditions or work methods are noted.
5. Maintain safe equipment, tools, environment.

Employee:

1. Observe prescribed work practices.
2. Report to supervisor any hazards that exist.
3. Report all injuries immediately.
4. Use protective devices and safety equipment.

Measuring Safety Performance

GOOD JUDGMENT IS BASED ON EXPERIENCE BUT EXPERIENCE IS APT TO BE BASED ON BAD JUDGMENT

The standard measure of how often injuries occur is the "injury frequency rate."

$$\text{Injury Frequency Rate} = \frac{\text{Number of disabling injuries} \times 1{,}000{,}000}{\text{Employee-hours of exposure}}$$

The standard measure of how serious the injuries are is the "injury severity rate."

$$\text{Injury Severity Rate} = \frac{\text{Total days lost} \times 1{,}000{,}000}{\text{Employee-hours of exposure}}$$

A "disabling injury" is a work injury which results in death, permanent total disability, permanent partial disability, or temporary total disability as designated in the American Standard Method of Recording and Measuring Work Injury Experience Z16.1-1954 published by the American Standards Association, Inc., 70 East Forty-Fifth Street, New York 17, N.Y.

Injury rates compiled in accordance with this standard may be used to evaluate:

a. The relative need for accident prevention activities in different departments of an establishment
b. The seriousness of the accident problem in an establishment or industry
c. The effectiveness of safety activities in establishments with comparable hazards
d. The progress made in accident prevention within an establishment or industry.

The U.S. Department of Labor's Bureau of Labor Statistics publishes monthly summaries of injury experience which may be used for comparisons.

Records

RECORDS ARE GUIDES TO PREVENTIVE EFFORTS

Pertinent facts concerning all accidents should be recorded as reminders and guideposts for analysis and action. A simple listing on a single sheet, with column headings as indicated, will provide a helpful story of the accident problem.

Name of injured	Date of injury	Occupation	Where it happened	How injury occurred	Nature of injury	Corrective action

Committees

TWO HEADS ARE BETTER THAN ONE

Safety is the responsibility of every worker on the job. The more workers who are educated, interested and made to participate in accident prevention efforts, the better the results which will be obtained.

Committees can be valuable if they have a purpose, an objective and a plan of action. A safety committee of two or three in even the smallest business can successfully implement the basic elements of a safety program. They can inspect, investigate, record, educate, and recommend control measures.

Committee personnel may include maintenance supervisors, personnel men, key operating supervisors and workers or their union representatives.

Inspect

THAT WHICH IS NOT INSPECTED DETERIORATES

Inspection is the preventive medicine of an accident prevention effort. It is performed by supervisors, safety committees, and/or individuals.

1. Supervisors inspect constantly to observe whether designated work practices and procedures are followed.
2. Workers inspect their machines, tools, and work areas to keep them in proper operating condition.
3. Committees or specialists inspect to control maintenance, fire, housekeeping, and special problems.

An inspection is of no value if the control information is not forwarded to the proper authority for action. All inspection items should be numbered with a followup system to assure that action has been taken. Where possible, action should be taken immediately.

Investigate

A PERSON WHO MAKES A MISTAKE AND DOES NOTHING ABOUT IT HAS ALREADY MADE HIS SECOND MISTAKE

Accidents should be investigated as soon after the occurrence as possible in order to determine the causes and to initiate corrective action.

To guide the investigation, the following questions should be answered in order:

Who . . . . . .
What. . . . . .
Where . . . . .
When. . . . . .
How . . . . . .
Why . . . . . .

The investigator should obtain as many details as possible and then compare all the facts to obtain the correct version of how the accident occurred. Then the necessary action should be taken to prevent the accident from happening again.

Supervisory Guidance

SUPERVISION
MEANS
SUPER
VISION

Although the success of any safety program requires the COMBINED efforts of management, supervision, and the worker, the SUPERVISOR is the KEY MAN

It is the degree to which the SUPERVISOR applies the INTENT of the program and the PRINCIPLES of safety that governs the success of this program.

Every good supervisor knows the importance of building a sound, cooperative job relationship. Safety is an area of mutual interest between the supervisor and the worker, and the supervisor must LEAD THE WAY in developing the "team spirit."

Education-Training

THE ABILITY TO MAKE INTELLIGENT CONTRIBUTIONS TO A JOB IS PROPORTIONATE TO THE EMPLOYEE'S EXPOSURE TO EDUCATIONAL OPPORTUNITIES

The employee must not only be taught the way to do his job, but must be taught to recognize and avert the hazards associated with the job.

An analysis of every job should be made by the supervisor to determine the most effective step-by-step procedure for handling it. All hazards should be included in this procedure with suggestions for control.

The employee should be trained in this safe procedure and observed to see that he continues to work accordingly. He should be told what not to do, as well as what to do.

Safety consciousness, awareness, and alertness must be part of every worker's indoctrination. A safety discussion with each worker once a week should be required of every supervisor.

Employee Cooperation Through Incentives

PEOPLE LIKE TO BE ENCOURAGED AND REWARDED

Arousing and maintaining interest in safety can take many forms. Encouraging people, through recognition, to cooperate in the program is important to gain voluntary acceptance of the program and to encourage continuous efforts by all personnel.

Safety contests, safety suggestion systems, meetings, periodicals, signs, slogans, and recognition of effort through awards of various types, are representative means of developing the interest of employees. Awards for the best housekeeping or for improvement of the injury rates will give the extra incentive which may be the difference between complacency and an active program.

Visual Aids

VISUALIZE TO EMPHASIZE

Visual aids can be an important part of the safety program by their use to point out specific hazards or to emphasize some safety message. Some of the visual aids which can be used are:

Posters - displayed at locations where employees congregate or pass frequently.
Bulletin Boards - for use in displaying posters, notices, safety equipment.
Safety Signs - to warn of hazard areas or give instructions.
Films - for showing at safety meetings or as training material.

Prepared by the Division of Safety Standards and Services

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