A RECOMMENDED SAFETY PROGRAM FOR THE MABRY FOUNDRY AND MACHINE COMPANY AND IRON CASTINGS INCORPORATED OF BEAUMONT, TEXAS

A Thesis

By

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secure descriptions of past accidents occurring at the plants concerned in this problem

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CHAPTER I

INTRODUCTION

The complexity of a modern industrial organization requires that top executives consider a multitude of things in order to continue in business. Uniformity of product quality, raw materials costs, labor costs, and labor relations are important in the minds of top management. It is realized that the success of any company depends to a large extent on the skills, abilities and attitudes of its employees. Much attention must be given to placement, training, and improving methods, in order to realize the full value of the employee. One of the very important aspects of utilizing the skills of labor so as to attain full benefits for both management and the employee which is frequently understressed or entirely overlooked is the matter of accident prevention.

Much can be accomplished concerning safety, employee attitudes, and overall cost cutting through the application of three basic principles of accident prevention. The principles are:

(1) Determining the causes and sources of accidents which have occurred in the past

(2) Correcting causes and sources of accidents by analyzing plant layout, processes used, mechanical safeguards, protective equipment and educational procedures

(3) Creating and maintaining an active interest in safety, from top management to laborers.

It is unfortunate that many companies feel that by carrying compensation insurance they are completely protected. This is an error that may prove costly when all facts are known. While companies are fully aware of the fact that they are required by law to provide compensation insurance for the employees, some of them, especially the smaller ones, do not realize that the costs of insurance are not fixed by law and may vary widely according to the accident costs incurred. Excess accident costs will result in extremely high rates. A company with a poor safety record will often find it difficult to secure a compensation insurance carrier. On the other hand, accident prevention can pay for itself and often be a form of profit to a company.

Typical examples of the many companies concerned with extreme accident prevention problems are the Mabry Foundry and Machine Company and Iron Castings, Incorporated. These two plants employ a total of approximately sixty workmen and are located in Beaumont, Texas. Both companies are discussed here because they are covered by the same compensation insurance policy, are under the same ownership, and have many common problems concerning accident prevention. A third organization, Beaumont Machine Works, is shown in the recommended organizational chart and is mentioned in several

instances in this report. It is included because of its close connection with the two foundries. Accident prevention at this plant, however, is beyond the scope of this study.

The recommendations and procedures presented here are offered as a possible basis for an accident prevention program. Some of the material discussed is common to all programs involving accident prevention, some is common only to foundries, and some is related only to the two companies concerned.

Because no complete accident records have been kept by either company, all information on past accidents was secured from the compensation insurance carrier. Due to the method used by the carrier in recording accidents, it was impossible to establish the information necessary in figuring the accident frequency rates or the severity rates of the two companies.

The problem has been approached as one including past accident analysis, plant and safety organization, and recommendations and procedures dealing with safety in the two foundries.

I. THE PROBLEM

Statement of the problem. It is the purpose of this study to propose the fundamentals of a safety program which, if adopted, will tend to decrease accident frequency and/or

severity rates of the Mabry Foundry and Machine Company and Iron Castings, Incorporated of Beaumont, Texas

Importance of the problem. The need for a safety program at these plants is evident because of the fact that from August 1, 1946 until July 31, 1953 approximately $50,000 has been paid to industrial insurance carriers by the two foundries involved in this question. Of this $50,000, approximately $14,000 was paid in the form of debit because of the high accident frequency and/or severity rates of the companies. The per cent debit or per cent credit is used as a basis for premium payments. It is determined by comparing the compensation and/or medical costs reported to the Texas Industrial Accident Board, for a particular foundry, with the costs reported by other foundries in the state. An average of 37.5 per cent debit has existed at these two foundries over the seven years covered by this study. This brings out the fact that accident costs have been 37.5 per cent greater than the average accident costs of other foundries in the state of Texas. The companies have never operated on a credit. The debit has ranged from 59.6 per cent during the 1949-1950 insurance year to 10.5 per cent during the 1951-1952 year. The present debit is 22.6 per cent.

During the seven year period being studied, there was an average of twenty-seven accidents per year; resulting in

an average cost of $265 per accident. This average cost does not exactly present a true picture because the large majority of accidents involved direct costs of less than $50 each. The overall average was increased due to the cost of a number of expensive claims. The twenty seven accidents per year average is high since the number of employees averaged about sixty. In other words, about one out of every two employees was injured and received medical attention every year.

II. DEFINITIONS OF TERMS USED

Accident Prevention. The hindrance of an occurrance that interrupts or interferes with the orderly procedure or progress of an activity,

Frequency Rate. An accident frequency rate is the number of injuries involving lost time per 1,000,000 man-hours worked.

Foundry. A building or group of buildings used for the production and processing of ferrous castings.

Lost Time Injury. An injury causing loss of working time beyond the day, shift, or turn during which the injury occurred.

Safety. The condition or state of being free; freedom from danger or hazard; expectation from hurt, injury or loss.

Severity Rate. The accident severity rate is the number of days of lost time per 1,000 man-hours worked.

Sand Mulling. The mixing of sands so as to evenly distribute, throughout a given quantity, the different ingredients such as water and clay.

Sand Slinger. A machine for reproducing the actions of a molder in filling a mold with sand. Sand is delivered in wads at high speed by centrifugal force, and directed by the operator into the mold as required.

Shake Out. The process of removing a casting from the sand mold, usually done by vibrating the mold.

CHAPTER II

REVIEW OF LITERATURE

Accident prevention is primarily a management function and is legally enforced. It is managements' responsibility to provide proper safety devices in the layout of the plant and in the machinery, equipment, tools, and processes used in production. The employee however, has a responsibility to his employer concerning safety. The employee's responsibility is to utilize machinery, equipment, tools, processes and safeguards in an intelligent and safe manner. The American Foundryman's Association[1] says that employees should work safely with the following ends in mind:

1. To protect themselves from being injured.
2. To work in an intelligent and safe manner to protect his fellow workers from harm.

The reason for accident prevention being a responsibility of management is summarized by Lippert[2] in his statements:

1. Accident prevention is a function of management because management alone has the authority and resources to correct the conditions and practices that cause accidents.

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[1] "Recommended Good Safety Practices For The Protection of Workers in Foundries," American Foundryman's Association, (Chicago: American Foundryman's Association, 1945) p. 9.

[2] F. G. Lippert, Accident Prevention Administration, (New York: McGraw-Hill Book Company, 1947), p. 6.

2. Accidents are a substantial source of expense. Efforts to prevent or reduce them are therefore justifiable economically.

Most of the published material dealing with accident prevention and safety in foundries is in the form of bulletins and magazine articles. Since the principles of safety organization and general procedures used in safety are common to all industries, books concerned with the overall picture are helpful in studying foundry safety. An extended search for books written primarily for foundry safety revealed there were none available for review.

The majority of aspects related to industrial operations are tangible, but safety is not. It is measured or based on an after-the-fact record. Studies and records show that 88 per cent of industrial injuries are a result of "human failure accidents". People in industry must be kept constantly conscious of hazards which are present at all times.

Accidents, according to Mould,[3] result from one of three causes:

1. A deliberate disregard for hazard in the face of ample warning.
2. Failure to be alert to known hazards.
3. Being completely unaware of the existence of a hazard.

[3] David Mould, "Getting Worker Cooperation in Industry," Safety Engineering, 93:18-19, May, 1947.

Safety is practical in industrial plants, no matter how small. Bennett[4] explains this by saying that, "the essentials of safety work in small plants are the same whether there are twenty five employees or two hundred and fifty."

Mould[5] outlines minimum standards for safety in plant operations of General Motors where safeguarding employees is considered an important task. The six basic requirements of a program at General Motors are:

1. Interest in safety on the part of top management.
2. A definitely established safety organization to each employee.
3. Adequate and capable full-time safety personnel.
4. Written safety procedure and instructions for each occupation.
5. Thorough safety instruction of new employees.
6. Stimulation of interest in safety on the part of every employee.

A complete record of each accident which results in an injury is an important aid in the prevention of recurrence. The safety director should have a "bird's eye view" of the situation at all times. He should be able to determine quickly, for any particular accident, the number of lost days to date, amount of compensation payments made, and the cost of medical and hospital fees. The purpose of individual

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[4] F. G. Bennett, "No Plant Too Small", Safety Engineering, 85:16, April, 1943.

[5] David Mould, "Getting Worker Cooperation in Industry", Safety Engineering, 93:18-19, May, 1947.

records is to aid in cumulative records which have a definite purpose and, as Blake[6] states, should make possible:

1. The study of causes and location of hazards in order to develop corrective measures.
2. The trend of accidents in each department and the plant as a whole and comparisons of plants and departments.
3. The preparation of concise reports for management in order that it may be aware of the conditions pertaining to safety.
4. The stimulation of added interest among workers.
5. The development of safety rules; the preparation of bulletins, posters, and material for safety meetings.

Every safety man should have an established method of accumulating and tabulating data. The American Standards Association[7] recommends that accidents be classified according to the factors of:

1. The agency and agency part
2. The unsafe mechanical or physical condition
3. The accident type
4. The unsafe act
5. The unsafe personal factor

Each accident report should include statements which would clearly indicate into which of these five categories the accident should be placed.

Management's closest representative to those usually involved in accidents is the foreman. He is in a key position

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[6] Roland Blake, Industrial Safety, (New York: Prentice-Hall, Inc., 1949), p. 314-15.

[7] "American Recommended Practice for Compiling Industrial Accident Causes," (New York: American Standard Association, 1941), p. 5.

so far as attaining accident prevention results are concerned. The foreman is closely associated with his men, often working side by side with them. Heinrich[8], an outstanding safety engineer and safety consultant, explains the importance of the foreman in accident prevention by pointing out that no safety program can hope to be a complete success without the sympathetic and intelligent support of able foremen. His influence and example give him a degree of control very important to safety work. The foreman's position is further emphasized in the statement by Foreman[9] that "The prime responsibility for the safe conduct of plant operations rests upon the shoulders of the supervisor". On the other hand, what is the foreman's attitude toward the safety supervisor? Is it one of, "Wonder what new safety guard he has cooked up this time", or does he feel a need and is he eager to aid in the prevention of accidents?

A safety director's approach to people is one of the most important tasks in his job of preventing accidents. Although everyone makes errors in human relations, these can be corrected by a constant practice of the art of smart relationship with others. As safety director one must meet

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[8] H. W. Heinrich, Industrial Accident Prevention, (New York: McGraw-Hill Book Company, 1941), p. 47.

[9] L. A. Foreman, S. B. Mason, Industrial Supervision, (Chicago: The Foundation Press, Inc., 1942), p. 195.

and discuss many different subjects with many different people; each of these persons should be correctly approached.

Wood[10] discusses problems which occurred at the Kimple Glass Division of the Owens - Illinois Glass Company. For example, the employee attitude was very poor. Also, there had been a great number of lost time accidents. To improve both of these a "Beat Par" safety contest was started. The average number of lost time injuries for a quarter, during the past five years, in each division was found. After this was determined, it was cut by 50 per cent and this number set as "par". It was decided to have a grand prize and a second prize. The first prize was a week-end trip for two and the second prize was a table model radio. To be eligible for the grand prize drawing the employees' division must have had less lost-time accidents than the "par" figure set for his division for the quarter. In addition to this, he must not have suffered a long-time injury himself. Those eligible for the second prize drawing included all people eligible for first prize plus everyone in the division equaling the "par" figure for the quarter. The project was promoted through letters to employees, bulletin boards, and the employees' paper. The results were good; the lost-time

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[10] W. W. Wood, "Can Safety Attitudes Be Changed", Glass Industry, 30:265 - 67, May, 1949.

injuries dropped 73 per cent and employee attitude had a marked improvement. This improvement was noted in general plant attitude of the employees and in particular by the eagerness to return to work after a small accident; whereas before they might have taken off four or five days to recuperate.

The Ohio Brass Company[11] found that slogans such as "Think Safety" and "Be Alert - Don't Get Hurt" along with competitive contests were very helpful in creating the basis of their safety campaign.

Every accident, whether or not an injury results, is costly. It represents a cost to the employer, to the injured worker and to society. Some are direct, others indirect; the direct costs include medical expenses and compensation payments. Those of an indirect nature, which it has been found are four times or more as great as compensation and/or medical payments, result from the following, as outlined by Heinrich:[12]

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

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[11] H. L. Pollack, "Look To Your Foundry," Safety Engineering, 91:32-3, January, 1945.

[12] H. W. Heinrich, Industrial Accident Prevention, (New York: McGraw-Hill Book Company, 1941), pp. 50-51.

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 injury 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 and 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 of subsequent injuries that occur in consequence of the excitement or weakened morale due to the original accident
11. Overhead cost per injury employee -- the expense of light, heat, rent, and other such items, which continue while the injured employee is a non-producer

An occupational disease common to foundry operations is silicosis. This disease is caused by the continued inhaling of very fine particles of silica dust. There are sources of silica dust in most every phase of foundry operation. Through normal plant procedures silica particles are reduced in size until they become harmful.

"Only those particles less than 3/2500 of an inch in size are generally considered to be sources of silicosis."[13]

Housekeeping and protective equipment are very important in foundries, according to Pallack.[14] Lack of good housekeeping is the reason for many metal burns and tripping injuries. A foundry today can be as clean and orderly as any other shop. Windows should be cleaned regularly; clean up gangs can and should be taught to give the foundry a thorough cleaning after each day's production. Schandel[15] agrees with the ideas of Palleck by saying that:

> Orderly piling, well-cleaned floors with tools, bars, etc., all in their proper racks up out of the way, aisles open -- all are a part of the story of proper foundry housekeeping.

Protective equipment, except safety shoes and gloves, is furnished to the employee by most companies. Safety goggles are a "must" during pour-off periods. Such safety engineers as Schandel[16] insist: "There is a form of eye protection available for every job; provide it and insist on its use." Leggings for pour-off men and asbestos spats for shifters are also necessary.

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[13] "Foundry Dust", Safety Engineering, 82:41, December, 1941, 83:40, January, 1942, 83:40, February, 1942.

[14] H. L. Pallack, "Look To Your Foundry," Safety Engineering, 91:32-3, January, 1945.

[15] T. A. Schandel, "Safety in Foundry Operations", The Foundry, 60:43-4, September, 1932.

[16] Loc. cit.

CHAPTER III

DESCRIPTIONS OF PARTICIPATING COMPANIES

Mabry Foundry and Machine Company

The first of three companies, now in existence, to be established was the Mabry Foundry and Machine Company. Founding of the company was based on the fact,

> That C. D. Mabry, in company with T. H. Mabry and F. D. Green, about the first of October, 1925, set about the establishment of an iron foundry business and operation of a machine shop in connection therewith at Beaumont, Texas.

This quotation is taken from the original application made by those concerned with the company's formation to the state of Texas in order that a charter of operation might be issued.

The capital investment of the original company was $35,000.00. Of this amount, $17,000.00 was in the form of stock belonging to D. C. Mabry and an equal stock being the property of T. H. Mabry; the additional ten shares, or $1,000.00 of capital stock was purchased by F.D. Green. This value of $35,000.00 cannot be considered as the total value of the company since the three owners spent approximately one year, without salary, in building the establishment. It is therefore estimated that the total value of the original plant was approximately $40,000.00.

Actual plant operations began late in 1925. During the first five years, the foundry and machine shop were kept busy practically "around the clock". The vast majority of work done was for the Gulf Oil Corporation, The Texas Company, and Humble Oil and Refining Company; these companies having petroleum refineries in the surrounding areas. There are no records of the exact tonnage, but it is estimated to have been about ten tons per day. The combined foundry and machine shop employed about thirty-five people, including office workers, pattern makers, charging crews, machinist, molders, and molder's helpers.

Early in 1932 the shop was closed; it remained closed for approximately twelve months. This shut-down was due not to a lack of business, but to a misunderstanding between the two brothers, D. C. Mabry and T. H. Mabry. The company, in its original form, was dissolved and sold by court order for $4,000.00; F. D. Green also selling out at this time. The plant was purchased by one of the original owners, D. C. Mabry.

When the plant again began operations, late in 1932 or early 1933, there were only four employees, including the owner. Each employee was paid $2.00 for a five day work week. The total sales were less than $500.00 for the first year's operation. In 1934 sales increased but were still less than $1,000.00. Progress continued in 1935 and 1936; the plant

employed about twenty men. The company continued to grow through the 1937 slump in business and until 1941.

With the war, which began in 1941, came unions, poor help, stringent government inspectors, government restrictions, and very little demand for grey iron products. All of these hindered further expansion, opposite to the progress afforded most companies because of the war.

In 1946, after the war, sales amounted to $120,000.00. Labor improved and grey iron products were again in demand. The 1947 sales amounted to $240,000.00 and those of 1948 totaled $480,000.00. In 1949, sales amounted to $620,000.00. No plant facilities were expanded during this time, the plant working practically anyone willing to work. The 1950 sales again increased, a total of $680,000.00 resulted. The increase would have been even more but a second company, Beaumont Machine Works, was organized in 1949 and now performed all machine work required by the foundry.

The 1951 sales set an all-time high of approximately $1,600,000.00, the tonnage averaged over 50 tons per day. The following year brought a softening market and resulted in a decrease in sales to $840,000.00. The payroll during 1952 amounted to approximately $260,000.00. It is believed that the sales for 1953 will be approximately the same as those of 1952.

A greater net profit is expected because of better labor control, increased production facilities, and closer cost control. Mabry Foundry and Machine Company now averages forty employees.

Originally Mabry Foundry and Machine Company was established to furnish jobbing castings to anyone. This policy continued until 1948 when the need for specialization was realized. At this time much of the hand molding was curtailed and semi-production equipment installed. Since the installation of this equipment, "river clamps" and municipal castings have been the main products. It is hoped, within the next several years, to develop a complete municipal line, including valves, fire hydrants, tapping sleeves, pipe, fittings, and manhole castings.

The future dreams of the company center around a semi-automatic foundry. The most modern molding devices -- shell molding and molding machines operating on a cycle, are to be included. Modern melting, pouring and sand systems are also desired.

Beaumont Machine Works

A second company was formed in August of 1949 to handle all of the machine work required by Mabry Foundry and in addition, outside jobbing work which it was hoped would be available. Although accident prevention at this company,

Beaumont Machine Works, is not treated within this study, the company is important because of its early relationship with Mabry Foundry and Machine Company and later with Iron Castings, Incorporated.

Beaumont Machine Works is owned by Bob and Joe Mabry, sons of D. C. Mabry, the original founder of Mabry Foundry and Machine Company, and Elmer Stockholm, the present manager. In the beginning only twelve men were employed. Most of the machinery used was that which had been part of the machine shop at Mabry Foundry. The approximate value of the original plant was $6,500.00. In four years' operation the number of employees working in the original building has more than doubled. The yearly sales amount to over $260,000.00. At this writing, building facilities at the Beaumont Machine Works are being doubled and additional machinery is being purchased. The founding of this company has proven most profitable, since it is one of the outstanding jobbing machine shops within the work area. Upon the completion of the present expansion program, it is estimated that the plant's value will be over $140,000.00.

A large portion of the work done at Beaumont Machine Works is performed in cooperation with its associated foundries. Other customers include De Long Engineers of Washington, D. C., Kaiser Engineers of California, Esso Standard Oil Company of New Jersey, and E. I. Du Pont de

Nemours of Wilmington, Delaware. Since the plant operates entirely as a jobbing shop, there is no main type of product. Within the past year, however, the manufacture of cast steel bodied valves and fabricated steel bodied valves has been an item of importance which may possibly lead to future specialization.

Iron Castings, Incorporated

The third and newest adventure by the original Mabry Foundry and Machine Company is the formation of Iron Castings, Incorporated. Construction of the plant was begun in August 1951, the first iron being poured in March 1952. Original plant value was $40,000.00

This plant was constructed for the purpose of producing grey iron castings of the highest quality, on a jobbing basis. Iron alloying was also to be a function of the foundry. Although grey iron now constitutes most of the production, "Ni-Resist" -- a development of the International Nickle Company, is also produced. In the near future, another iron alloy, also developed by International Nickle Company, and known as "Ni-Hard", which is widely used for grinding balls, will be poured. The production of grey iron will be continued with alloy irons as a specialty.

Production now averages about six tons of iron per day, which is far below the existing capacity of the plant.

Total employment is now twenty-five persons. The sales for the first year's operations were within the $100,000.00 range.

CHAPTER IV

ANALYSIS OF PAST ACCIDENTS

All accidents which were reported to the industrial compensation insurance carrier from August 1, 1946 to July 31, 1953 have been reviewed. The names of the injured, dates of accidents, descriptions of accidents, and total direct costs involved have been secured and are included in Appendix I. This information was secured from the compensation insurance carrier. A number of accidents, many of which occurred during 1952 and until July 31, 1953, were accidents involving no lost time which were paid for directly by the companies. Not all records of "no-lost-time" accidents were kept by the companies, but direct contact with the plants has shown that the majority of these were eye injuries and general industrial accidents requiring only first aid from a doctor or nurse.

The accidents have been broken into two parts; those occurring in connection with Mabry Foundry and Machine Company, and those concerned with Iron Castings, Incorporated. They have been analyzed, whenever possible, according to the American Standards Association's recommended method of "Compiling Industrial Accident Causes"[1] and according to procedures recommended by insurance carriers. In some

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[1] American Recommended Procedures for Compiling Industrial Accident Causes, Part II, Z16.2-1941, National Safety Council, American Standards Association, New York: 1941.

instances the descriptions and information taken from medical bills paid by the companies were not complete enough to be analyzed according to the American Standards Association's prescribed methods. Had a good safety program been in effect, these accidents could have been properly analyzed. The accidents occurring in connection with the individual foundries have been further broken down by policy year, which begins on August 1st of the different years. When records were available, those accidents occurring during a given year have been classified by the:

(1) Agency Producing Accident --- that object, substance, of exposure which is most closely associated with the injury and which could be made safer.

(2) Agency Type --- the manner of contact of the injured person with an object, substance, or exposure, or the movement of the injured person which resulted in the injury.

(3) Part of the Body Injured --- that portion of the body such as the appendages, extremities, trunk, head and vital organs whose function is impaired by injury.

(4) Nature of the Injury --- the particular type of injury caused by the agency producing the accident.

Following this analysis is a general discussion of the accidents occurring during the particular year.

It should be pointed out that the number of cases filed does not necessarily agree with the number of accidents discussed in the section covering "Part of the Body Injured". As an example, if an employee burns his hands and face, only one case is involved, but two parts of the body were affected. Direct costs of medical bills and compensation would be divided equally between the hands and the feet.

At the end of the chapter is an analysis of the policy years being studied. Totals, comparisons, and conclusions for the several years are made.

ANALYSIS OF AND CONCLUSIONS DRAWN FROM ACCIDENTS INVOLVING MABRY FOUNDRY AND MACHINE COMPANY FROM AUGUST 1, 1946 TO JULY 31, 1953

Conclusions Drawn From Accidents Occurring Between August 1, 1946 and July 31, 1947

The direct costs occurring between August 1, 1946 and July 31, 1947 were due mainly to four major accidents. These four accidents cost $11,105.28; the total of all accident costs for the year being $12,488.24. This total was far above the expected loss as calculated by the insurance carrier, according to the premium paid by the company. The calculated expected loss was $1,565.00. Had these four major accidents not occurred, the actual loss would have been approximately $200.00 less than the calculated expected loss.

A study of the accidents occurring that year indicates that:

(1) The wide variety of accident types and high frequency of accidents for a small plant indicate a definite need for a strong safety program.

(2) Possibly many of the accidents resulted from a lack of proper training in safety procedures which could have a definite effect on overall employee attitude.

(3) The most serious accident was one very common to many industrial plants, namely back strains. This cause for compensation is often very difficult to prove when taken into the courts, either in favor of or against the employee. Proper handling facilities may have prevented the accident.

(4) Proper guarding of moving machinery would have aided in the prevention of the second most costly accident. Guards should have been located so that employees could not have come in contact with moving lugs on the centrifical casting machine.

(5) The number of injuries to the trunk of the body was second only to eye injuries. These trunk injuries, most of which were back injuries, resulted in the greatest total cost of injuries to different parts of the body.

(6) Safety glasses may have aided in the prevention of the type injury occurring most frequently, that of foreign bodies entering the eyes. This was however, one of the least expensive types of injuries occurring that year. The agency for these foreign bodies, dust, was the most common agency and resulted in the most common nature of injury, irritations.

(7) Safety shoes, which are now being worn by all employees, but were not worn in 1946 and 1947, may have prevented injuries to the toes and feet; there being a total of seven for the year.

(8) The third most expensive and second most frequent accidents involved the fingers. It is believed that many of these were caused by the lack of safety consciousness, and lack of proper training in procedures.

ACCIDENT ANALYSIS -- AUGUST 1, 1946 TO JULY 31, 1947

AGENCY PRODUCING ACCIDENT

ASA CODE 1.1

0000	Machines	Total 3
	Casting Machine, Centrifugal	1
	Lathe, Wood	1
	Saw, Wood	1
0300	Hoisting Apparatus	Total 2
	Crane, Overhead Traveling	2
0600	Vehicles	Total 3
	Wheelbarrow	
0900	Electrical Apparatus	Total 3
	Sand Mixer, Portable	
1200	Highly Inflammable and Hot Substances	Total 5
	Iron, Molten or Hot	4
	Tar, Hot	1
1300	Dust	Total 9
	Iron and/or molding sand	8
	Core sand	1
1500	Working Surfaces	Total 2
	Ground	1
	Walls	1

1900	Miscellaneous	Total 13
	Molds and Flasks	6
	Core	2
	Pattern	1
	Grinding Wheel	2
	Casting	2
XX00	Unclassified	Total 1
	(insufficient data)	1

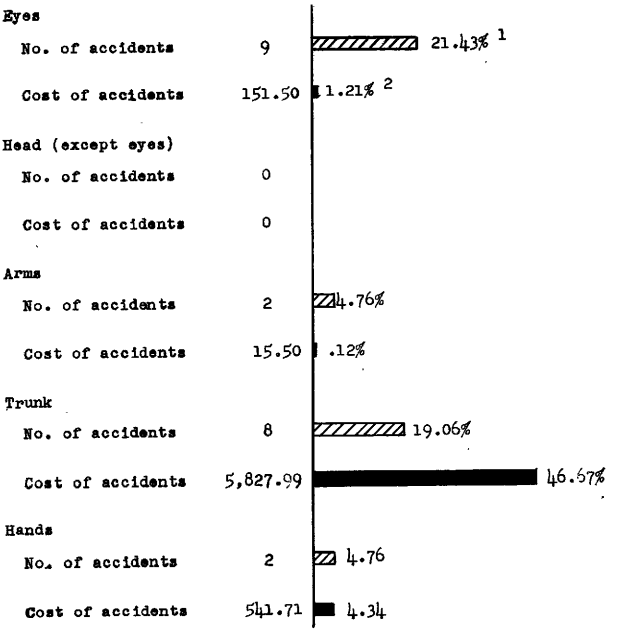
ACCIDENT TYPE

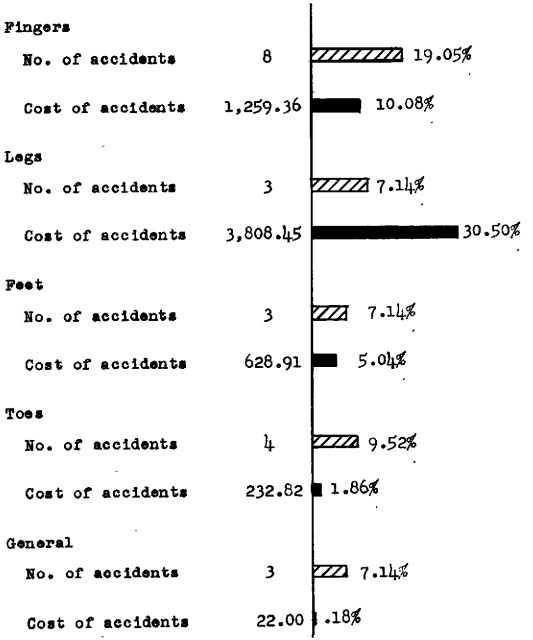
ASA CODE 3.1

0	Striking Against	
	(refers generally to contacts with sharp or rough objects, resulting in cuts, slivers, punctures, etc., due to striking against, kneeling on or slipping on objects)	2
1	Struck by	
	(falling, flying, sliding or moving objects)	17
2	Caught in, on, or between	3
3	Fall on same level	1
4	Fall to different level	0

5 Slip (not fall) or overexertion (resulting in strain, hernia, etc.)	7
6 Contact with temperature extremes (resulting in burns scales, freeze, heat exhaustion, sunstroke, frostbite, etc.)	7
7 Inhalation, absorption, indigestion (asphyxiation, poisoning, drowning, etc., but excluding contact with temperature extremes)	0
8 Contact with electric shock (resulting in electrocution, shock, etc.)	3
9 Accident type, n. e. c.	0
X Unclassified -- insufficient data	1

PART OF BODY INJURED
TABLE I




Fingers
No. of accidents
8
19.05%
Cost of accidents
1,259.36
10.08%
Legs
No. of accidents
3
7.14%
Cost of accidents
3,808.45
30.50%
Feet
No. of accidents
3
7.14%
Cost of accidents
628.91
5.04%
Toes
No. of accidents
4
9.52%
Cost of accidents
232.82
1.86%
General
No. of accidents
3
7.14%
Cost of accidents
22.00
.18%

Unclassified	
No. of accidents	0
Cost of accidents	0

[1] Per cent of total number of accidents occurring this year

[2] Per cent of direct accident costs for the year

NATURE OF INJURY

Abrasions	1
Amputations	1
Bruises	5
Burns	5
Crushes	4
Fractures	2
Infections	1
Irritations (including foreign body eye injuries)	9
Lacerations	4
Shock	3
Strains, Soreness, Swelling	6

Conclusions Drawn From Accidents Occurring Between August 1, 1947 and July 31, 1948

The number of accidents occurring during this insurance year were greater than any other year covered by this study. The total direct costs of the accidents, however, were less than was expected - $2,443.31; approximately $800.00 less than the calculated loss based on the premium paid. This difference between expected and actual loss represents a relatively safe year since expected losses are calculated from premiums which are based on past experience.

The 1947-1948 insurance year indicates the following points of interest:

(1) Injuries to the fingers resulted in the greatest total cost of accidents to a specific part of the body. A finger accident was the second most expensive single accident, costing $373.40. The causes of the majority of the finger accidents, it is believed, resulted from causes similar to the accident occurring the preceding year; that is a lack of safety consciousness and lack of proper training in procedures. These reasons for the accidents is given because they were mostly small accidents which could have been prevented if the employee had given thought to the proper way of handling his job.

(2) The most expensive single accident was caused by a faulty electric lift. The medical and compensation cost involved was $480.23 and caused bruises on the upper portion of the leg. This and four other accidents to the legs involved the second most expensive group of specific body accidents, their total costing $530.48.

(3) Forty-one of the sixty-one accidents were of the type where the injured was "struck by" an object. Twenty of the forty-one "struck by" accidents involved dust, sand and/or iron that entered the eyes, causing irritation. The total cost of the eye accidents was $431.02, or the third most expensive group of injuries to a specific part of the body. Most of these might have been prevented had safety glasses been provided.

(4) Second in frequency, only to eye accidents, were those involving the feet, there being thirteen such accidents. The direct costs were the fourth greatest, $379.74. Had the injured been required to wear foot protection in the form of safety shoes and ten inch, quickly removable safety boots for those working around hot metals, many of these accidents could have been prevented.

ACCIDENT ANALYSIS -- AUGUST 1, 1947 TO JULY 31, 1948

AGENCY PRODUCING ACCIDENT

ASA CODE 1.1

0000 Machines	Total 1
Type not given	1
0300 Hoisting Apparatus	Total 7
Traveling Crane	7
0600 Vehicles	Total 2
Wheelbarrow	2
0800 Mechanical Power Transmission Apparatus	Total 1
Belts and Pulleys	1
1000 Hand Tools	Total 4
Hammer	4
1200 Highly Inflammable and Hot Substances	Total 7
Molten (or hot) metal (iron)	7
1300 Dust	Total 20
Metal Chips	3
Grinding Dust (iron)	15
Cupola Dust	1
Core Sand	1

1500 Working Surfaces	Total 2
Roof	1
Floor	1
1900 Miscellaneous Agencies	Total 15
Casting	10
Core	1
Oxygen Cylinder	1
Ladel of iron	2
Mold and Flask	1
XX00 Agencies Unclassified	Total 1
(insufficient data)	1

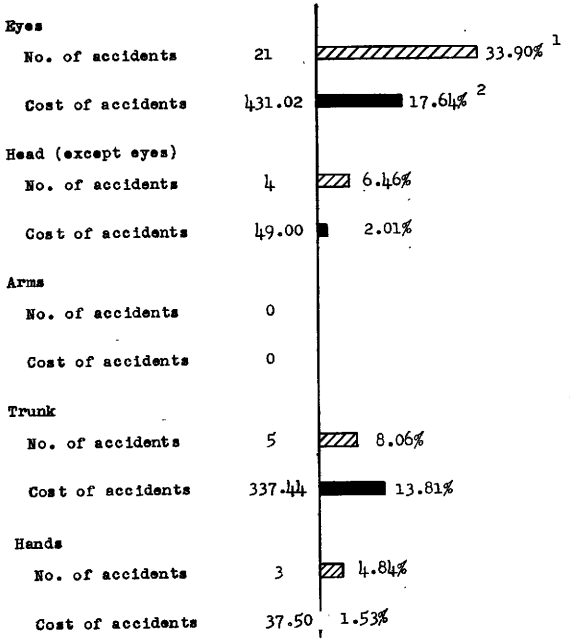
ACCIDENT TYPE

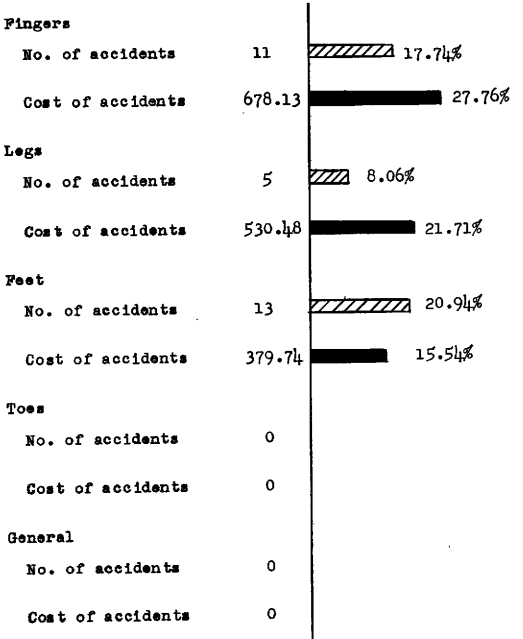
ASA CODE 3.1

0 Striking Against	
(refers generally to contacts with sharp or rough objects, resulting in cuts, sliver, punctures, etc., due to striking against, kneeling on or slipping on objects)	2
1 Struck by	
(falling, flying, sliding or moving objects)	41

2 Caught in, on, or between	4
3 Fall on same level	0
4 Fall to different level	1
5 Slip (not fall) or overexertion (resulting in strain, hernia, etc.)	4
6 Contact with temperature extremes (resulting in burns scales, freeze, heat exhaustion, sunstroke, frostbite, etc.)	8
7 Inhalation, absorption, ingestion (asphyxiation, poisoning, drowning, etc., but exeluding contact with temperature extremes)	0
8 Contact with electric shock (resulting in electrocution, shock, etc.)	0
9 Accident type, n. e. c.	0
X Unclassified -- insufficient data	0

PART OF BODY INJURED
TABLE II




Fingers
No. of accidents
11
17.74%
Cost of accidents
678.13
27.76%
Legs
No. of accidents
5
8.06%
Cost of accidents
530.48
21.71%
Feet
No. of accidents
13
20.94%
Cost of accidents
379.74
15.54%
Toes
No. of accidents
0
Cost of accidents
0
General
No. of accidents
0
Cost of accidents
0

Unclassified	
No. of accidents	0
Cost of accidents	0

[1] Per cent of total number of accidents occurring this year

[2] Per cent of direct accident costs for the year

NATURE OF INJURY

Amputations	1
Bruise	11
Burn	9
Crushed	5
Fracture	3
Irritations (including foreign body eye injuries)	20
Laceration	7
Strains, Swelling	5

Conclusions Drawn From Accidents Occurring Between August 1, 1948 and July 31, 1949

The policy year of 1948-1949 had relatively few accidents reported, but considerable costs were involved. Only five accidents were reported to the insurance carrier, resulting in direct costs of $10,217.61.

The accident analysis for this year shows that:

(1) One accident, the death of a truck driver, caused a major portion of accident costs that year. The death resulted in a cost of $9,000.00. The employee concerned was on his first long trip since starting to work for the company. The truck he was driving was new, having only about five hundred miles on its speedometer at the time of the accident. A complete accident description was not available to aid in analyzation.

(2) The second most serious accident was a finger and hand injury which occurred when the employee tried to connect moving pulleys with a belt. The injury cost a total of $1,131.00. The employee had not been trained to be hazard conscious.

(3) Of the other three accidents, two were eye injuries where foreign bodies entered the eye, and the third was a fracture involving a flask clamp being dropped on a workman's finger.

ACCIDENT ANALYSIS -- AUGUST 1, 1948 TO JULY 31, 1949

AGENCY PRODUCING ACCIDENT

ASA CODE 1.1

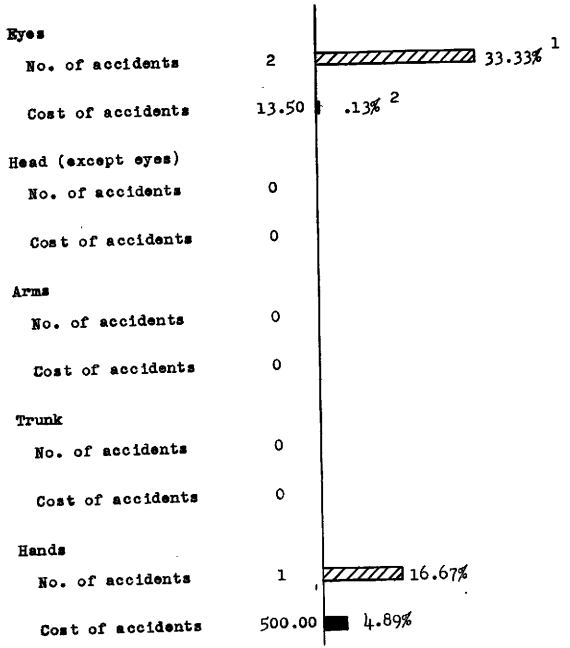
0600 Vehicles	Total 1
Truck	1
0800 Mechanical Power Transmission Apparatus	Total 1
Pulley	1
1300 Dust	Total 2
Iron Dust	2
1900 Miscellaneous Agencies	Total 1
Flask Clamp	1

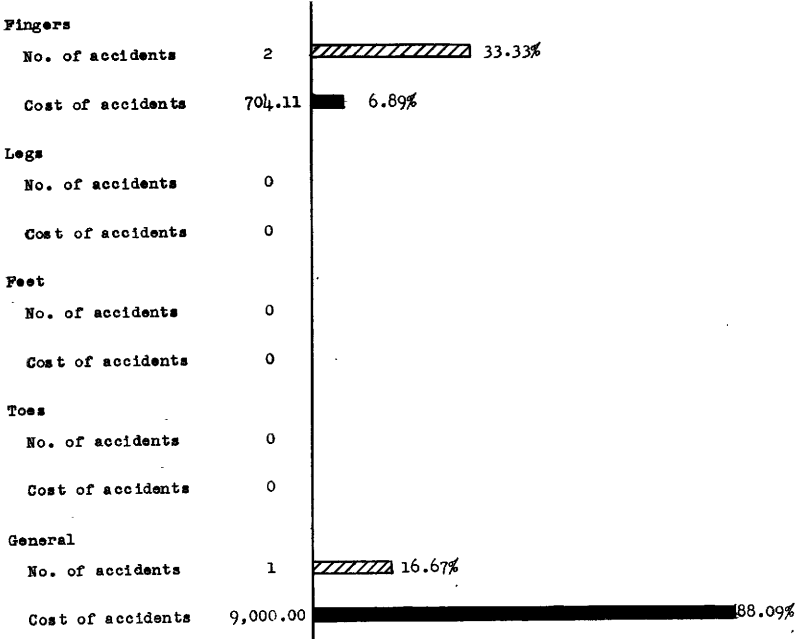
ACCIDENT TYPE

0 Striking Against	
(refers generally to contacts with sharp or rough objects, resulting in cuts, slivers, punctures, etc., due to striking against, kneeling on or slipping on objects)	1
1 Struck by	
(falling, flying, sliding or moving objects)	2

2 Caught in, on, or between	2
3 Fall on same level	0
4 Fall to different level	0
5 Slip (not fall) or overexertion (resulting in strain, hernia, etc.)	0
6 Contact with temperature extremes (resulting in burns, scales, freeze, heat exhaustion, sunstroke, frostbite, etc.)	0
7 Inhalation, absorption, ingestion (asphyxiation, poisoning, drowning, etc., but excluding contact with temperature extremes)	0
8 Contact with electric shock (resulting in electrocution, shock, etc.)	0
9 Accident type, n. e. c.	0
X Unclassified -- insufficient data	0

PART OF BODY INJURED
TABLE III




Fingers
No. of accidents
2
33.33%
Cost of accidents
704.11
6.89%
Legs
No. of accidents
0
Cost of accidents
0
Feet
No. of accidents
0
Cost of accidents
0
Toes
No. of accidents
0
Cost of accidents
0
General
No. of accidents
1
16.67%
Cost of accidents
9,000.00
88.09%

Unclassified	
No. of accidents	0
Cost of accidents	0

[1] Per cent of total number of accidents occurring this year

[2] Per cent of direct accident costs for the year

NATURE OF INJURY

Death	1
Fracture	1
Irritation (including foreign body eye injuries)	2
Laceration	1

Conclusions Drawn From Accidents Occurring Between August 1, 1949 and July 31, 1950

A total of $940.57 was the resulting cost of nine accidents during the 1949-1950 policy year.

These nine accidents, when studied, show that:

(1) Accidents involving the fingers resulted in four accidents and a cost of $611.60. They were the most expensive injuries of the year.

(2) The only foot injury, an iron burn, was the second most expensive and may have been prevented had high top safety shoes and asbestos leggings been worn.

(3) A large percentage of the accidents involved the eyes, but their costs were not comparatively high. Four irritations caused by foreign bodies entering the eyes may have been prevented had safety glasses been provided and their wearing required.

ACCIDENT ANALYSIS -- AUGUST 1, 1949 TO JULY 31, 1950

AGENCY PRODUCING ACCIDENT

ASA CODE 1.1

0000	Machine	Total 1
	Wood Lathe	1
0300	Hoisting Apparatus	Total 1
	Traveling Crane	1
1200	Highly Inflammable and Hot Substances	Total 1
	Iron	1
1300	Dusts	Total 4
	Miscellaneous Types	1
	Iron and/or Sand	3
1900	Miscellaneous Agencies	Total 2
	Label	1
	Casting	1

ACCIDENT TYPE

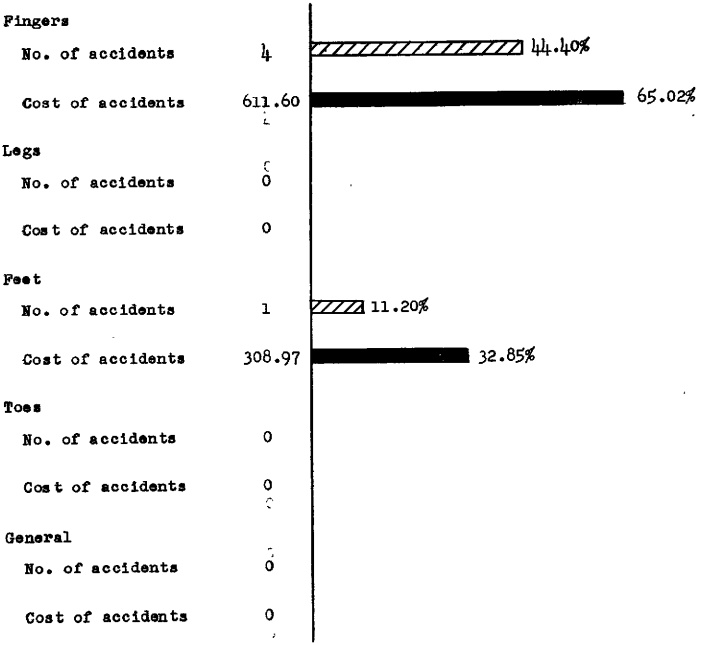
0 Striking Against

(refers generally to contacts with sharp or rough objects, resulting in cuts, slivers, punctures, etc., due to striking against, kneeling on or slipping on objects) 0

1 Struck by (falling, flying, sliding or moving objects)	5
2 Caught in, on, or between	3
3 Fall on same level	0
4 Fall to different level	0
5 Slip (not fall) or overexertion (resulting in strain, hernia, etc.)	0
6 Contact with temperature extremes (resulting in burns scales, freeze, heat exhaustion, sunstroke, frostbite, etc.)	1
7 Inhalation, absorption, ingestion (asphyxiation, poisoning, drowning, etc., but excluding contact with temperature extremes)	0
8 Contact with electric shock (resulting in electrocution, shock, etc.)	0
9 Accident type, n. e. c.	0
X Unclassified -- insufficient data	0

PART OF BODY INJURED
TABLE .IV

Eyes		
No. of accidents	4	44.40% [1]
Cost of accidents	20.00	2.13% [2]
Head (except eyes)		
No. of accidents	0	
Cost of accidents	0	
Arms		
No. of accidents	0	
Cost of accidents	0	
Trunk		
No. of accidents	0	
Cost of accidents	0	
Hands		
No. of accidents	0	
Cost of accidents	0	


Fingers
No. of accidents
4
44.40%
Cost of accidents
611.60
65.02%
Legs
No. of accidents
0
Cost of accidents
0
Feet
No. of accidents
1
11.20%
Cost of accidents
308.97
32.85%
Toes
No. of accidents
0
Cost of accidents
0
General
No. of accidents
0
Cost of accidents
0

Unclassified	
No. of accidents	0
Cost of accidents	0

[1] Per cent of total number of accidents occurring this year

[2] Per cent of direct accident costs for the year

NATURE OF INJURY

Amputation	2
Burn	1
Irritation (including foreign body eye injuries)	4
Laceration	2

Conclusions Drawn From Accidents Occurring Between August 1, 1950 and July 31, 1951

The accidents occurring this year were greatly increased in cost because of two expensive injuries; one being a $2,299.95 back injury, the other a thumb amputation resulting in a $1,106.66 cost.

Accident conclusions:

(1) Thirteen accidents were those classified as the "struck by" type. Seven of these were eye irritations, the remainder involving various parts of the body. Had safety glasses been worn by the employees, many eye injuries could have been prevented.

(2) Five of the twenty accidents were due to overexertion; two of which were back injuries, two strains to the lower trunk section and one side strain. Had sufficient mechanical equipment been provided some of these overexertions may have not occurred. These five trunk injuries were the most expensive for the year; the total cost being $3,077.91.

(3) Finger injuries were expensive due to two amputations, one costing $1,106.66 and the other $628.76. The most expensive was a result of there being no guards provided between the electric switch used to operate the charging bucket and the rail over which the bucket moved. The $628.76 injury was due to poor handling facilities.

ACCIDENT ANALYSIS -- AUGUST 1, 1950 TO JULY 31, 1951

AGENCY PRODUCING ACCIDENT

ASA CODE 1.1

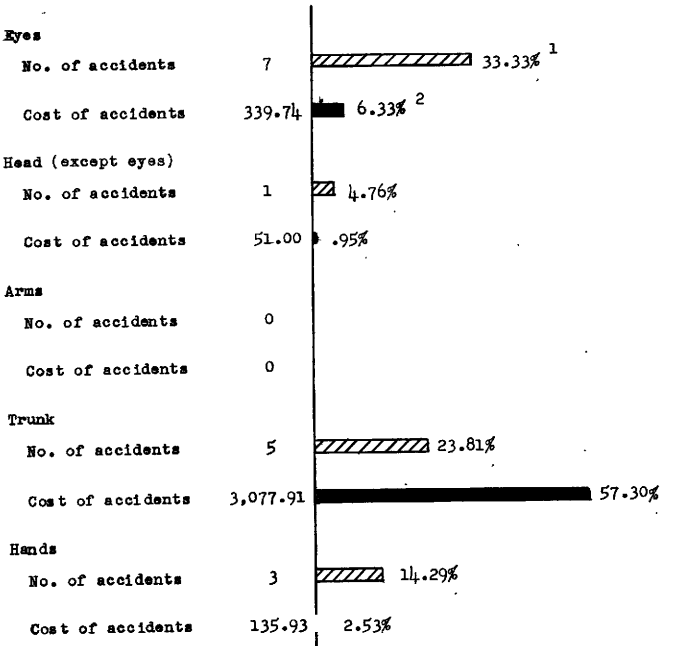
0000	Machines	Total 3
	Molding Machine	1
	Air Grinder	1
	Drill Press	1
0300	Hoisting Apparatus	Total 4
	Traveling Crane	3
	Charging Bucket	1
0600	Vehicles	Total 2
	Truck	2
1200	Highly Inflammable and Hot Substances	Total 3
	Hot Iron	3
1900	Miscellaneous Agencies	Total 6
	Mold and Flask	1
	Casting	1
	Concrete Forms	1
	Barrel of Iron	1
	Core Box	2
XX00	Agency Unclassified	Total 2
	(insufficient data)	2

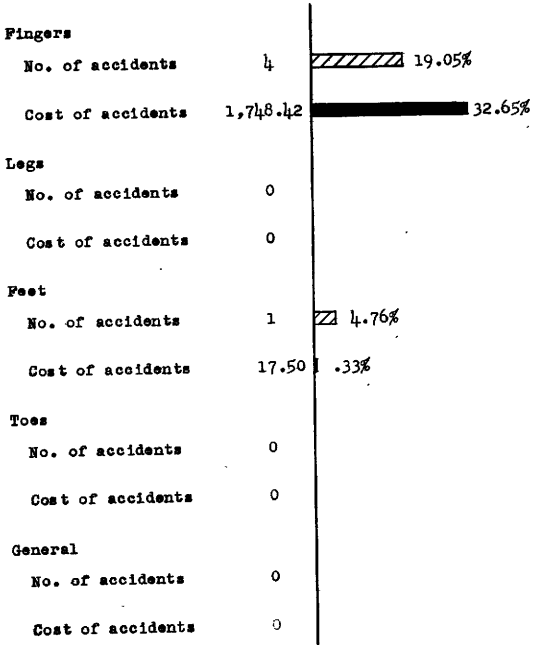
ACCIDENT TYPE

ASA CODE 3.1

0 Striking Against (refers generally to contacts with sharp or rough objects, resulting in cuts, slivers, punctures, etc., due to striking against, kneeling on or slipping on objects)	0
1 Struck by (falling, flying, sliding or moving objects)	13
2 Caught in, on, or between	1
3 Fall on same level	0
4 Fall to different level	0
5 Slip (not fall) or overexertion (resulting in strain, hernia, etc.)	6
6 Contact with temperature extremes (resulting in burns scales, freeze, heat exhaustion, sunstroke, frostbite, etc.)	0
7 Inhalation, absorption, ingestion (asphyxiation, poisoning, drowning, etc., but excluding contact with temperature extremes)	0
8 Contact with electric shock (resulting in electrocution, shock, etc.)	0
9 Accident type, n. e. c.	0
X Unclassified -- insufficient data	0

PART OF BODY INJURED
TABLE V




Fingers
No. of accidents
4
19.05%
Cost of accidents
1,748.42
32.65%
Legs
No. of accidents
0
Cost of accidents
0
Feet
No. of accidents
1
4.76%
Cost of accidents
17.50
.33%
Toes
No. of accidents
0
Cost of accidents
0
General
No. of accidents
0
Cost of accidents
0

Unclassified	
No. of accidents	0
Cost of accidents	0

1 Per cent of total number of accidents occurring this year

2 Per cent of direct accident costs for the year

NATURE OF INJURY

Amputation	1
Crushed	2
Irritation (including foreign body eye injuries)	6
Laceration	5
Sprain	1
Strain	5

Conclusions Drawn From Accidents Occurring Between August 1, 1951 and July 31, 1952

Since nothing was done to prevent the recurrence of eye accidents, it is believed that this type of injury occurred as frequently and resulted in costs comparable to preceding years. Neither the number of eye injuries nor the costs were paid to the doctors by the company and not reported to the compensation carrier.

A study of the analysis shows that:

(1) The most expensive accident of the year might have been prevented if the proper footwear had been in use. The description of the accident as provided by the compensation insurance carrier is not clear, in that it implies vaguely that the wrench which was raising the river clamp broke, causing the casting to drop on the employee's foot. If such was the case, the accident cause would have been assigned to "defective hoisting equipment". The cost of the foot injury resulting from the river clamp hitting the foot was $1,218.85.

(2) The second most expensive accident was caused by an employee being struck on the head and shoulders by a wrench which fell from an overhead working area where maintenance was being done. The direct cost involved was $1,212.05. That floor space beneath the working area should have been

kept clear of employees. If workmen were necessary in the area, they should have been provided with safety helmets.

(3) Accidents occurring to the trunk of the body were the most frequent. Most of these were back injuries involving relatively small costs. Trunk injuries ranked third in cost; this being due largely to the fact that half the cost of the second most expensive injury, which was previously discussed, was assigned to the trunk.

(4) The second most frequent group involved the most expensive single accident and was also the most costly group. There was a total of four accidents involving the feet; their total costs being $1,727.32.

(5) The second most expensive group resulted in hand injuries; this group ranked third in frequency. Two of the three hand accidents resulted from the same source, that being a sand mulling machine. It is believed that these were probably due to one or both of two causes, (a) absence of mechanical safeguards; or (b) improper operating instructions.

ACCIDENT ANALYSIS -- AUGUST 1, 1951 TO JULY 31, 1952

AGENCY PRODUCING ACCIDENT

ASA CODE 1.1

0000 Machines	Total 2
Muller, Sand	2
0600 Vehicles	Total 1
Truck	1
1000 Hand Tools	Total 1
Wrench	1
1200 Highly Inflammable and Hot Substances	Total 3
Gas	1
Iron	2
1500 Working Surfaces	Total 1
Floor	1
1900 Miscellaneous Agencies	Total 6
Casting	4
Mold	1
Pipe	1

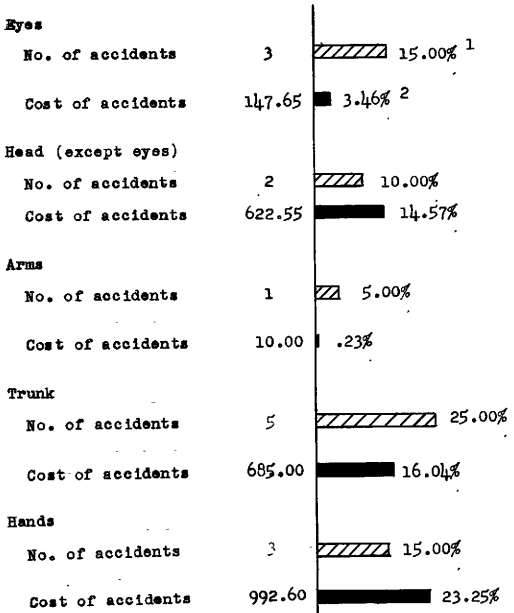
ACCIDENT TYPE

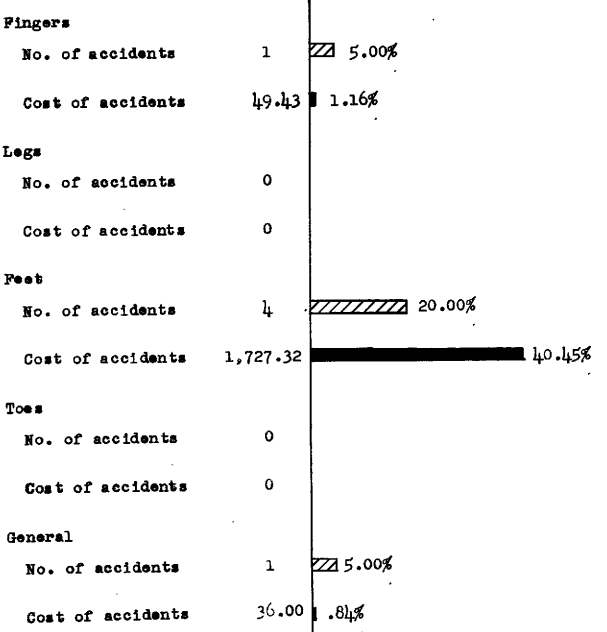
ASA CODE 3.1

0 Striking Against (refers generally to contacts with sharp or rough objects, resulting in cuts, slivers, punctures, etc., due to striking against, kneeling on or slipping on objects)	0
1 Struck by (falling, flying, sliding or moving objects)	4
2 Caught in, on, or between	3
3 Fall on same level	2
4 Fall to different level	0
5 Slip (not fall) or overexertion (resulting in strain, hernia, etc.)	3
6 Contact with temperature extremes (resulting in burns scales, freeze, heat exhaustion, sunstroke, frostbite, etc.)	3
7 Inhalation, absorption, ingestion (asphyxiation, poisoning, drowning, etc., but excluding contact with temperature extremes)	0
8 Contact with electric shock (resulting in electrocution, shock, etc.)	0

9 Accident type, n. e. c.	0
X Unclassified -- insufficient data	0

PART OF BODY INJURED
TABLE VI




Fingers
No. of accidents
1
5.00%
Cost of accidents
49.43
1.16%
Legs
No. of accidents
0
Cost of accidents
0
Feet
No. of accidents
4
20.00%
Cost of accidents
1,727.32
40.45%
Toes
No. of accidents
0
Cost of accidents
0
General
No. of accidents
1
5.00%
Cost of accidents
36.00
.84%

Unclassified

No. of accidents	0
Cost of accidents	0

[1] Per cent of total number of accidents occurring this year

[2] Per cent of direct accident costs for the year

NATURE OF INJURY

Bruises	1
Burns	3
Crushes	5
Fractures	2
Strains	4

Conclusions Drawn From Accidents Occurring Between August 1, 1952 and July 31, 1953

Due to the few accidents which were reported to and paid by the compensation insurance carrier, an accurate analysis according to the "American Recommended Practice for Compiling Industrial Accident Causes"[1] is not possible for the 1952-53 year of the compensation policy. From information available, the following is indicated:

(1) The direct costs of twenty of the twenty-four accidents, of which there are any records, were paid directly by the company.

(2) Records of these twenty accidents are very vague since they were taken from medical bills sent to the company by the doctors rendering services. Only a description of the service rendered the patient, its cost, and patient's name, and the date that services were rendered are included. These cases resulted in a total cost of $220.25.

(3) Twelve of the twenty "no-lost-time" accidents were due to foreign bodies entering the eyes; their cost was $121.25. The remaining eight "no-lost-time" accidents involved only first aid office calls, most of which were for

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[1] "American Recommended Practice for Compiling Industrial Accident Causes", National Safety Council, (New York: American Standards Association, 1941), 37 pp.

X-rays and dressing of minor injuries.

(4) The predominating accident cost of the year was paid for a silicosis case. This case cost the compensation carrier $5,263.60. The prevention of this common foundry disease is best handled by a yearly check of the silicosis possibilities resulting from processes or materials involved in plant operations. Analyses were made in 1947 and in 1951 to determine the silicosis possibilities at this foundry. The results showed that under normal operating conditions, it was not possible for an employee to contact silicosis. It was nevertheless proved that the claimant in the case had the disease. It was also pointed out that it was possible to contact the disease as much as ten years before feeling its effects; the employee paid had worked for the company approximately this length of time.

(5) Of the other three injuries, one was a foot injury costing $57.89 caused by the employee having his foot under the "sand cutter" when it was started. A guard properly placed may have prevented this.

(6) Another case reported to the compensation carrier was the result of a bar, used to guide the pouring ladel, slipping out and hitting the man in the hip. The bar was later firmly attached to the ladel. The direct cost of the accident was $197.11.

(7) The fourth accident which involved the compensation carrier resulted in a total direct cost of $46.50. The employee was operating a "shake out" machine when a piece of iron flew up and hit his eye. Safety glasses may have aided in the prevention of this accident.

ACCIDENT ANALYSIS -- MARCH 1, 1952 TO JULY 31, 1953

AGENCY PRODUCING ACCIDENT

ASA CODE 1.1

0000	Machines	Total 14
	Casting Machine, Centrifugal	1
	Lathe, Wood	2
	Saw, Wood	1
	Molding	1
	Air Grinder	2
	Drill Press	1
	Muller, Sand	4
	"Shake-out"	1
	Type Not Given	1
0300	Hoisting Apparatus (except elevators)	Total 14
	Crane, Overhead Traveling	13
	Charging Bucket	1
0600	Vehicles	Total 9
	Wheelbarrow	5
	Truck	4
0800	Mechanical Power Transmission Apparatus	Total 2
	Belts and Pulleys	2
0900	Electric Apparatus	Total 3
	Sand Mixer, Portable	3

1000	Hand Tools	Total 5
	Hammer	4
	Wrench	1
1200	Highly Inflammable and Hot Substances	Total 20
	Iron, Molten or Hot	18
	Tar, Hot	1
	Gas	1
1300	Dusts	Total 34
	Iron and/or Molding Sand	31
	Core Sand	1
	Cupola Dust	1
	Miscellaneous Types	1
1500	Working Surfaces (n.e.c.)	Total 5
	Ground	1
	Walls	1
	Roof	1
	Floor	2
1900	Miscellaneous Agencies	Total 46
	Molds and Flasks	9
	Core	3
	Pattern	1
	Grinding Wheel	2
	Casting	19
	Oxygen Cylinder	1

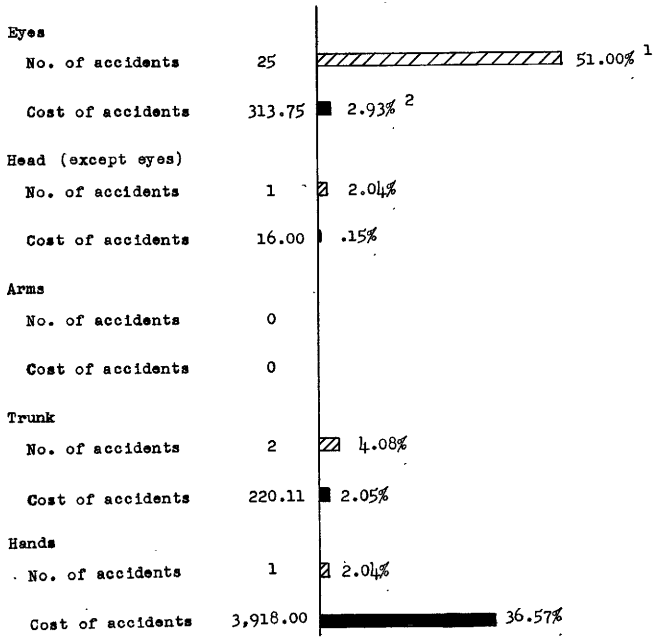
1900	Miscellaneous Agencies (Cont'd)	
	Ladel of Iron	4
	Clamp, Flask	1
	Concrete Forms	1
	Barrel of Iron	1
	Core Box	2
	Pipe	1
	Silicosis	1
XX00	Agency Unclassified	Total 46
	Insufficient Data	46

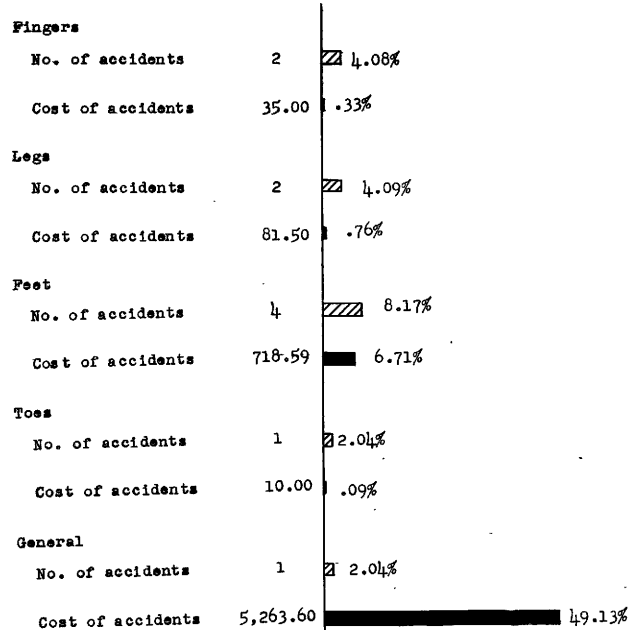
ACCIDENT TYPE

0	Striking Against (refers generally to contacts with sharp or rough objects, resulting in cuts, slivers, punctures, etc., due to striking against, kneeling on or slipping on objects)	5
1	Struck by (falling, flying, sliding or moving objects)	109
2	Caught in, on, or between	18
3	Fall on same level	3
4	Fall to different level	1

5 Slip (not fall) or overexertion (resulting in strain, hernia, etc.)	19
6 Contact with temperature extremes (resulting in burns scales, freeze, heat exhaustion, sunstroke, frostbite, etc.)	20
7 Inhalation, absorption, ingestion (asphyxiation, poisoning, drowning, etc., but excluding contact with temperature extremes)	0
8 Contact with electric shock (resulting in electrocution, shock, etc.)	3
9 Accident type, n. e. c.	0
X Unclassified -- insufficient data	18

PART OF BODY INJURED
TABLE VII




Fingers
No. of accidents
2
4.08%
Cost of accidents
35.00
.33%
Legs
No. of accidents
2
4.09%
Cost of accidents
81.50
.76%
Feet
No. of accidents
4
8.17%
Cost of accidents
718.59
6.71%
Toes
No. of accidents
1
2.04%
Cost of accidents
10.00
.09%
General
No. of accidents
1
2.04%
Cost of accidents
5,263.60
49.13%

Unclassified		
No. of accidents	10	20.42%
Cost of accidents	137.00	1.28%

[1] Per cent of total number of accidents occurring this year

[2] Per cent of direct accident costs for the year

NATURE OF INJURY

Abrasions	2
Amputations	4
Bruises	27
Burns	19
Crushes	20
Death	1
Fractures	8
Infections	1
Irritations (including foreign body eye injuries)	67
Lacerations	18
Shock	3
Silicosis	1
Strains, Soreness, Swelling	24
Insufficient data to classify	10

CONCLUSIONS DRAWN FROM ACCIDENTS INVOLVING IRON CASTINGS INCORPORATED FROM MARCH 1, 1951 TO JULY 31, 1953

Conclusions Drawn From Accidents Occurring Between March 1, 1951 and July 31, 1952.

Iron Castings, Incorporated had only one accident to occur which was effected by the 1951-1952 compensation policy covering themselves and Mabry Foundry and Machine Company. The company began operations late in the insurance year.

The single accident was one that, in all probability, could have been easily prevented. Had safety goggles been properly fitted and in use, the foreign body would have probably not entered the eye, causing a direct cost to the compensation carrier of $17.00

Conclusions Drawn From Accidents Occurring Between August 1, 1952 and July 31, 1953

As was the case with Mabry Foundry and Machine Company, the only complete records kept on accidents during the 1952-1953 compensation policy year were those reported to the compensation carrier. The remaining accidents involved no lost time and were paid for directly by the company to the doctors rendering services to the employees.

Conclusions drawn from existing records show that:

(1) There are records of twenty-four accidents occurring between August 1, 1952 and July 31, 1953. Five of these were handled by the compensation carrier, at a cost of $4,642.20.

(2) One case resulted in costs of $3,918.00. The employee did not follow instructions, which had been given him only the day before, on the proper method of operating the sand conveyor. A sampling cup, used to remove sand samples, was provided but not used. The operator used his hand to remove the samples from the machine and caught it in the mixing device. It is believed that a poor attitude on the part of the employee and his failure to think and follow instructions were the causes of the accident.

(3) Three of the four remaining accidents reported to the compensation carrier involved the feet. The direct costs

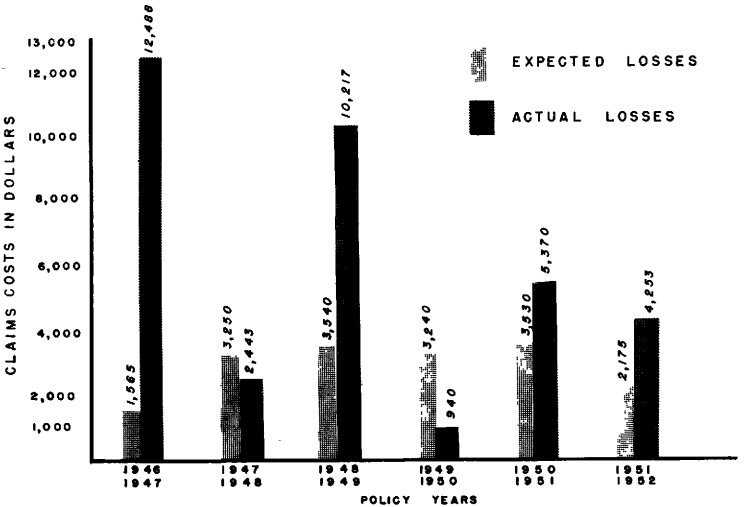
were $705.20. One was a burn caused by hot metal entering the shoe. In the second case a casting fell on the man's foot. The third claim was for a foot injury caused by a flask falling. These last two may have been prevented had proper lifting devices been installed. Safety glasses should have been provided and their wearing enforced.

(4) Of the nineteen accidents which were paid for directly by the company, eleven were eye injuries where foreign bodies had entered the eye. The cost of these eleven eye injuries was $127.00. The remaining eight cases involved a puncture wound, laceration of the finger, X-rays, and muscular strains. The direct cost of the eight accidents was $159.00.

Conclusions Drawn From An Analysis of Accidents Occurring At The Mabry Foundry and Machine Company And Iron Castings Incorporated Between August 1, 1946 and July 31, 1953

During the seven years covered by this study, the total direct cost of accidents to the Mabry Foundry and Machine Company and Iron Castings Incorporated was $49,010.25. Had all records been available, covering doctor bills paid by the company for some of the "no-lost-time" accidents, it is believed that the total costs involved would have been considerably higher. Of the total cost covered in available records, $48,504.00 was paid to the industrial compensation insurance carrier. Much of this amount is due to an average debit of 37.5 per cent resulting from the high frequency and/or severity rates of the companies. It is believed that this debit could have been lowered and that possibly the companies could have operated on a credit, had a strong safety program been in effect.

The need for an accident prevention program may be partially indicated by Figure 1. The expected losses, based on premiums paid, are plotted parallel to the direct costs of the accidents to the compensation carrier. Had a program, stressing accident prevention been in effect, the costs would have more closely matched or possibly fallen below the expected losses. As a result of the high costs and irregularity of



EXPECTED LOSS—ACTUAL LOSS GRAPH

FIGURE 1

the costs, the debits upon which the premiums were paid also were irregular, as shown by Figure 2.

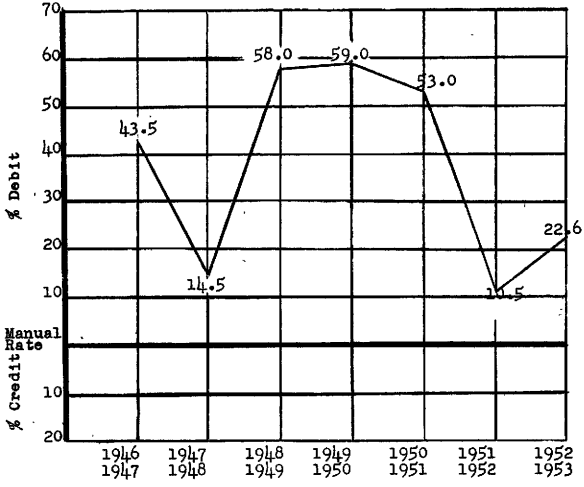
A comparison for the different years of the premiums paid, the losses of direct costs to the compensation carrier, the number of claims and the operating debit may be made from Figure 3.

The outstanding facts as indicated from the analysis of accidents occurring at the two plants are:

(1) The agency producing the most accidents was dust, usually as a result of grinding operations. The dust entered the eyes as foreign bodies. Dust was the further cause of the most frequent accident type, "struck by"; and the most common form of injury, irritations.

(2) The eyes were involved in seventy one or 34.0 per cent of all injuries, but only 3.0 per cent of the total costs of accidents. It is believed that the wearing of proper eye protection would have eliminated a large portion of these eye cases.

(3) It is interesting to note that accidents involving the entire body or a large portion of it, here classified as "general", involved only 2.8 per cent of all accidents, but 30.8 per cent of the total costs, while the eye injuries, previously discussed, were nearly the opposite; 34.0 per cent of the total number involving 3.0 per cent of the costs.



POLICY YEAR

Figure 2

DIFFERENCE BETWEEN OPERATING RATES AND MANUAL RATES

YEARLY PREMIUM VERSUS LOSSES CHART

Mabry Foundry and/or Iron Castings

Insurance Year	Premium	Losses	Number of Claims	Cr.	Dr.
1946 - 1947	3,740	11,593	41		43.5
1947 - 1948	6,205	2,377	61		14.5
1948 - 1949	9,351	9,180	6		58.0
1949 - 1950	8,632	978	9		59.6
1950 - 1951	8,995	5,636	20		53.1
1951 - 1952	6,970	4,012	15		10.5
1952 - 1953	4,611	10,207	9		22.6
Totals	48,504	45,983	161		37.5 (avg.)

Figure 3

A large portion of the costs involving the body in "general" were due to one accident; a death costing $9,000.00 This high cost - low frequency and vice versa is often the case in many accident investigations.

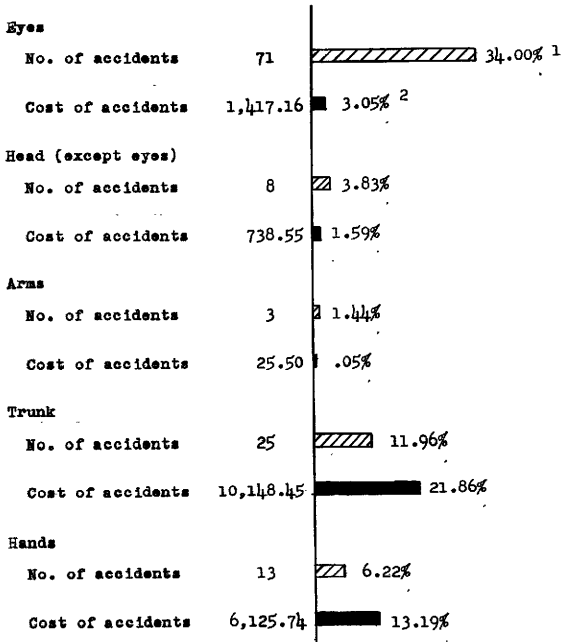
(4) The part of the body involving the second most expensive cases was the trunk. There was a total of twenty five or 11.9 per cent of the total number and $10,148.25 or 21.8 per cent of the total costs resulting from trunk injuries. Most of these can be further narrowed down to back injuries. Had proper hand lifting procedures been explained and insisted upon and more mechanical lifting apparatus been provided, a majority of the back injuries could have been prevented.

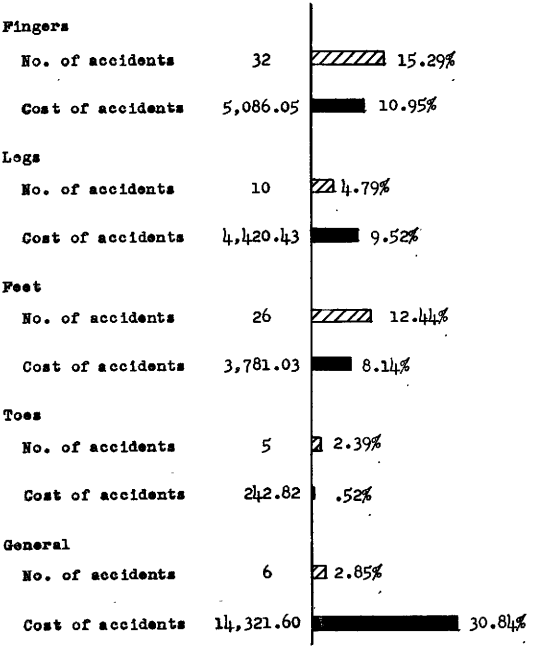
(5) Hot substances were the second most common agency; there were a total of twenty such accidents. Proper protective equipment and training in procedures should have been provided.

(6) Failure to properly use and maintain the overhead traveling crane caused fourteen accidents. Proper lifting techniques to be followed while operating an overhead crane should be included as part of a safety education program.

(7) The analysis covering "Part of the Body Injured", may be used as a valuable aid in determining where the most time and money should be spent in preventing accidents.

PART OF BODY INJURED
TABLE VIII




Fingers
No. of accidents
32
15.29%
Cost of accidents
5,086.05
10.95%
Legs
No. of accidents
10
4.79%
Cost of accidents
4,420.43
9.52%
Feet
No. of accidents
26
12.44%
Cost of accidents
3,781.03
8.14%
Toes
No. of accidents
5
2.39%
Cost of accidents
242.82
.52%
General
No. of accidents
6
2.85%
Cost of accidents
14,321.60
30.84%

Unclassified		
No. of accidents	10	4.79%
Cost of accidents	137.00	.29%

[1] Per cent of total number of accidents during seven years being studied

[2] Per cent of direct accident costs during seven years being studied

CHAPTER V

PHYSICAL HAZARDS NOW IN EXISTENCE AND PROPOSED CORRECTIVE MEASURES

Many of the accidents which have occurred are the direct result of physical hazards in existence at the two foundries concerned in this study. Responsibility for the elimination of physical hazards is a concern of four groups, to be discussed in Chapter VII, (1) Top Management, (2) The Safety Director, (3) Foremen, and (4) The Individual Workers. The elimination of hazards would not only be of benefit by aiding in the decrease of the number and costs of accidents, but would be helpful in attaining increased and more economical production. The costs involved in the installation and maintenance of these physical improvements would be offset substantially by the benefits which they would produce.

Through a study of the accident descriptions available, plant inspections, and personal observations made while being employed by the two foundries, five outstanding physical hazard groups have been selected and will be discussed. The five groups cover:

(A) Poor Housekeeping

(B) Unsafe Mechanical and Manual Lifting Methods

(C) Dusts and Flying Particles

(D) Lack of Proper Illumination

(E) Electrical Hazards

Items discussed under these five groups are not necessarily the only existing hazards related to the group; the most outstanding were selected.

A. POOR HOUSEKEEPING

The term "housekeeping" does not only refer to cleanliness within the operations of a plant, but also is concerned with the fact that everything should have a place and that it should be in its proper place at all times. Housekeeping may include such items as the proper piling and storage of materials, clean aisles and work areas, and the overall condition of the structures within a plant layout.

Employees will have an increased "pride of workmanship" if their work area and the plant in general is orderly. Blake[1] is of the opinion that, "Orderliness in the working area is conducive to orderliness in the thinking area of the individual". If an area is put in good order, and the employee's attitudes are as they should be, the workers will be encouraged to maintain this condition. Reduction of fatigue and customer confidence are two more results of good house-

[1] Roland P. Blake, Industrial Safety, (New York: Prentice - Hall, Inc., 1949), p. 132.

keeping.

Housekeeping Within Foundry Buildings

An outstanding example of poor housekeeping is illustrated by Figure 4. This picture was taken near the center of the main molding floor of the Mabry Foundry and Machine Company. Miscellaneous materials such as air hose, flask clamps, and short timbers have been haphazardly thrown around the base of a structural supporting column. Poor housekeeping such as this demonstrates untidiness, inefficient equipment storage, poor training, and most important of all, poor employee attitude.

Figure 4

Air hoses should be neatly rolled and hung on a proper hanger attached to the column. The pieces of timber should be orderly piled together out of the aisles. Flask clamps are often lost and sometimes are the cause of tripping accidents, when left to lie on the molding floor. Racks, made of metal, should be provided so that the different sizes of clamps could be separated and the clamps removed from the floor. These racks should be placed along the edge of the molding floor close to the area in which they are to be used. This would make them easily accessible to the workmen, and at the same time would aid in the return to their proper place after they had been used.

Another poor housekeeping practice, which should be eliminated, is the throwing of scrap paper, wood checking blocks used between flasks and flask [illegible], and paper bags which had been raw materials containers in the [illegible]. This practice is most common at [illegible] especially hazardous here since sand mulling is [illegible] muller which could easily be [illegible] items.

Uneven floors are common at [illegible] and are a cause of tripping accidents and falls. [illegible] floors should be leveled regularly by using tr[illegible] mechanical devices now in use at the foundries.

A practice common to both iron castings, incorporated, and Avery Foundry is the improper stacking of flasks. The following suggestions will aid in the storage of flasks not in use:

(1) No group of flasks should be stacked higher than six feet.

(2) Flasks should be stacked with their greatest areas parallel to the ground.

(3) Only flasks of one size should be stacked together.

(4) Ample room should be provided between stacks so as to allow for easy movement of the flasks.

(5) Flasks should be stored in an area easily accessible by overhead traveling cranes.

Figure 5 is an example of a group of properly stacked flasks. This picture was made at Avery Foundry.

All work areas should be cleaned of materials, tools, and equipment upon the completion of a job or operation or at the end of each shift. Cleaning and storing such items are mainly an individual employee responsibility, since he used the articles and is responsible for their physical conditions.

An important housekeeping responsibility, although not directly connected with plant operations, is the maintaining of clean employee bath houses, rest rooms, and dressing rooms.

Figure 5

Combination bath houses and dressing rooms are provided for both white and colored workers at [redacted] Foundry. The buildings provided, however, are not adequately constructed. Facilities provided meet the basic needs but no more. Sanitary conditions are far below standard; the thorough cleaning of accumulative materials from these buildings is a definite management responsibility. The employee also has his responsibility in keeping these conveniences clean. Old clothes,

towels, paper, etc., should either be put in waste containers or placed in an orderly manner within lockers provided for the purpose.

Iron Castings, Incorporated has provided excellent rest room facilities for its employees. No shower rooms or dressing rooms have been provided. The employees now use these rest rooms as dressing rooms; causing undesirable sanitary conditions to exist. A management decision should be made and enforced; either proper facilities should be provided or rest rooms should no longer be used by the employees as dressing rooms. The concrete and tile construction of the rest rooms at Iron Castings, Incorporated adds to the practicability of a thorough weekly cleaning.

The employee should be reminded that this service is a convenience to him and an expense to the company. Management should render such services, however, with the idea in mind of maintaining a desirable employee attitude toward his employer and consequently his job.

Orderliness in Plant Yard Areas

Proper storage methods and upkeep of yard storage areas is essential to the movement of equipment and materials. A complete inventory control system is impossible unless it is known what is on hand and where it is located. Storage areas should by systematically divided and properly marked. Poorly

stacked or located yard items are a definite hazard to materials movement within the yard area. All materials should be properly located and stacked. The methods used in stacking will depend upon the items being considered, but examples such as shown in Figure 6 should not be allowed to exist. This is not an exceptional example, but rather common occurrence in the yard areas of ~~both foundries being studied~~ the foundry. The scene in Figure 6 is an existing condition at ~~Iron Castings, Incorporated~~ the Byrne Foundry.

Figure 6

The yards should be kept as level as possible in order that mechanical lifting devices can move about easily. Overcrowding should be avoided, as should stacking to excess heights.

High grass within storage areas produces poor attitudes which result in further untidiness and accidents. Lost materials result. Grass areas should be cut, chemically destroyed or burned periodically as an aid to proper housekeeping within a yard.

B. UNSAFE MECHANICAL AND MANUAL LIFTING METHODS

During the period between August 1, 1946 and July 31, 1953, eighty of the 209 accidents were caused by or during materials handling operations. This is 38 per cent of all accidents. Thus, more than one out of every three accidents involved materials handling. The majority of the eighty accidents resulted from manually handling materials. This high percentage indicates that there is a definite need for improved handling facilities and/or training in handling techniques at the Mabry Foundry and Machine Company and Iron Castings, Incorporated.

It is believed that more mechanical lifting devices should be provided at both plants. Mabry Foundry has a definite need for such equipment since many of the lifting

devices now in use are old, in some cases in poor condition, and there is an inadequate quantity. The installation of such items as jib cranes and monorail conveyers would be a definite advantage to safety and plant operating procedures at both plants.

Perhaps the greatest need for mechanical lifting is in moving castings into and around the grinding rooms and for loading and unloading trucks. Most of these procedures are now carried on through manual lifting. Correct methods employed in manual lifting have not been given and have caused some of the greatest accident expenses because back injuries have resulted. The hazards involved in manual materials handling accidents are largely a problem of education and enforcement, ~~and will be discussed in a chapter to follow.~~

C. DUST AND FLYING PARTICLES

Industrial dust and small flying particles are common hazards in many foundries. These may be harmful to the extremities as well as the internal parts of the body. They may be the source of occupational diseases, cuts, or irritations. Two of the most common sources of dust and fine particles of sand and/or iron found in an iron foundry are:

(1) Grinding Operations

(2) Sand Preparation and Shake Out Operations

Grinding Operations

All grinding operators, performing this operation on machines not serviced by a dust collector system at the machine should wear respirators. Dust collectors are recommended for all stationary grinding machines, tumbling barrels, and other forms of stationary grinding equipment. It is difficult and usually not practical to provide dust collectors, at the point of operation, when using portable hand grinders; therefore respirators are necessary for these operations. Respirators are provided at both Mabry Foundry and Iron Castings, Incorporated, but their wearing should be more strongly enforced. This can be accomplished by a combination of company rules and safety education.

Dusts are a hazard from standpoints other than occupational diseases. A large percentage of accidents which have occurred at the two foundries being discussed are the result of foreign bodies, in the form of dust particles, entering the eyes. Most of these can be prevented by providing employees with eye protection. Eye protection should be worn by all employees, not only those working in dust areas. There is often dust and other forms of foreign bodies which may cause accidents encountered in general plant operations. Goggles should be provided for those in extremely dusty areas and spectacle type protectors for all other employees.

An efficient method of removing dusts which have settled is by an industrial vacuum cleaning system. This system may consist of either vacuum lines running throughout the shop, with hose outlets at intervals, or it may be a portable type industrial vacuum cleaner.

Sand Preparation and Shake Out Operations

Sand preparation methods differ at Mabry Foundry and Iron Castings, Incorporated. At Mabry Foundry, this operation is performed by a combination "sand slinger" and mulling machine. The machine moves through the shop on a track. Sand is picked up off the molding floor, where it has been piled by shake out crews, and is mulled by a screw type conveyor and then dumped into a bucket conveyor which carries the prepared sand to the "sand slinger" portion of the machine. A dust collector is not practical on this muller "sand slinger" because of its design. Although little dust is formed, it is recommended that those working in the immediate vicinity wear respirators.

The preparation of sand at Iron Castings, Incorporated differs from the method used at Mabry Foundry in that all storage and mulling of sands is done in a stationary closed mulling machine of modern design. The hazard involved occurs after the sand is prepared. After a batch of sand (13 cu. yds.) has been prepared, it is fed onto an open belt conveyor which

carries the sand to a hopper. Sand is drawn from the hopper as needed for molding operations. The hazard arises as the sand moves along the open belt and as it is dumped into the hopper. Although the sand is damp (containing about 3 per cent moisture) dust is generated. Respirators are necessary for safe operations in this area.

The greatest dust hazard at both foundries occurs during shake out operations. Mabry Foundry uses a portable machine and shakes out all flasks onto the molding floor. This produces an extreme condition which cannot practically be eliminated by a dust collector system. The condition is of a nature that unless respirators are worn, it is sometimes difficult to breathe normally in the shake out area.

A dust collector system would be very practical for the method of shake out used at Iron Castings, Incorporated. The shake out machine is stationary, flasks being transported to this machine by overhead cranes. A condition which exists every time a flask is shaken out is illustrated in Figure 7. An additional hazard occurs when the sand falls through the shake out onto a belt conveyor located in an open pit below ground level. The dust condition within the pit is extreme, dust also rising to the work area. This dust is detrimental to both workmen and equipment. Figure 8 shows dust on equipment within the pit; a collector would eliminate the vast

Figure 7

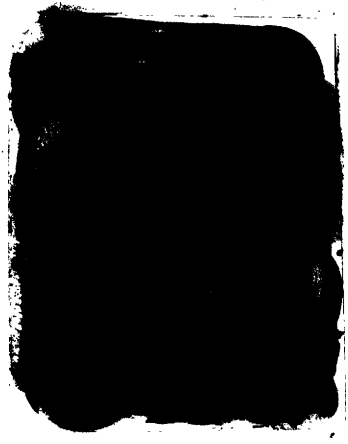


Figure 8

majority of this dust [illegible] ground level by the actual shake out operation.

Possible Results of Foundry Dust

The outstanding physical result of dusts in iron foundry operations is the pneumoconiosis, or emphysema, of the occupational disease known as silicosis. Compensation amounting to $5,263.60 was recently paid an employee of Mabry Foundry who claimed silicosis [illegible] proceeding.

The definition of silicosis [illegible] Health Practices Pamphlet No. 4[2] is that,

> Silicosis is a chronic disease of the lungs resulting from prolonged inhalation of fine particulate silica. It is manifested anatomically by formation of sharply defined fibrous nodules not over four to six mm. in diameter, which in most cases are uniformly distributed throughout all portions of both lungs; and clinically by a paucity of symptoms and physical sounds that usually appear only in late stages of the disease and by a tendency to become complicated by tuberculosis. In some cases, nodulation is concentrated in certain parts of the lungs in which cases symptoms may be marked.

Size of the silica particles [illegible]. The periodical, "Safety Engineering"[3] [illegible] critical size given in the above definition by the National Safety Council by saying that, "Only those particles smaller than 3/2500 of an inch in size are generally considered [illegible] sources of silicosis."

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[2] Health Practices Pamphlet, "Industrial Dusts", Health Practices Pamphlet No. 4, (Chicago: National Safety Council, 1939), page 3.

[3] "Foundry Dusts", Safety Engineering, 82:41, December, 1941, 83:40, January, 1942, 83:40, February, 1942.

The existence of these particles and the presence of the possibility of silicosis depends upon four factors as outlined by Sappington[4],

> (1) The concentration of dust -- the amount of dust in the breathing atmosphere.
> (2) The size of dust particles -- It is generally agreed that particles under ten microns are the more destructive.
> (3) Mineral composition of the dust. This refers particularly to the quartz content of inhalid dust.
> (4) Length of occupational exposure.

Periodic analysis should be made of foundry operations to determine the possibility of employees comtacting silicosis. It is recommended that an analysis be made yearly or whenever a major change of product or methods occurs, this has not previously been done. The most recent check made at either of the two foundries was conducted at Mabry Foundry by Texas Employers Insurance Association in March of 1951. The result of the analysis is shown by a summary table, Figure 9. These results were reported to Mabry Foundry with comments and recommendations. Excerpts from these comments and recommendations include the following statements:

> Although the analysis (Summary Table) shows that Silica Dust Concentrations are well below the threshold limit values, we believe that a physical examination should be made of all employees prior to job assignment. This examination should include a radiological examination of the lungs.

---

[4] Dr. O. C. Sappington, "Silicosis - Industrial Enemy", Factory Management, 93:291, July, 1935.

Figure 9

SUMMARY TABLE
OF
INDUSTRIAL HYGIENE STUDY
AT
MABRY FOUNDRY AND MACHINE COMPANY
MARCH 1951

Sample No.	Location	Dust conc. m.p./cu. ft.*	T. L. V. ‡ m.p./cu. ft.	c/c Particles Below 10 Microns#	Free Silica as Quartz
1	Portable Grinder	2.4	20.0	85.0%	16.3%
2	Pedestal Grinder	3.6	20.0	75.0%	15.5%
3	Grinding pipe Casting	18.0	20.0	9.0%	15.5%
4	Swing Grinder	2.4	20.0	88.0%	15.5%
5	Core Making	1.2	5.0	85.0%	85.0%
6	Shake Out	2.1	20.0	82.0%	15.5%
7	Moulding	1.05	20.0	60.0%	21.2%
8	Filling and Removing Flasks	6.0	20.0	75.0%	27.5%

* Million particles per cubic foot of air

‡ Threshold limit value

According to authorities, inhalation of free silica particles less than 10 microns in size causes the dust silicosis.

When the need of respirators arises, we suggest that only approved equipment be furnished workers.

Silicosis, like other occupational diseases and accidents in general, can be prevented. Heinrich[5] outlines a plan for controlling occupational diseases:

(1) Elimination of injurious substances of sources.
(2) Reduction of the original amounts or volumes or frequency of use of the injurious substances or sources.
(3) Removal of injurious substances or sources after use.
(4) Isolation, guarding, or enclosing of the injurious substances or sources.
(5) Control of unsafe personal acts.
(6) Provision of personal protective devices.

D. LACK OF PROPER ILLUMINATION

Good illumination has for some time been accepted as an important factor in industrial accident prevention. The Accident Prevention Manual For Industrial Operations[6] states that, "Estimates of the proportion of industrial accidents attributable to poor lighting have varied from 15 to 25 per cent". Proper lighting is a definite aid to increased production as well. The intensity of light required will be completely dependent upon the area and operation types con-

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[5] H. W. Heinrich, Industrial Accident Prevention, New York: McGraw-Hill Book Company, 1941), page 293.

[6] Accident Prevention Manual For Industrial Operations, National Safety Council, (Chicago: National Safety Council, 1951), pages 1 - 18.

cerned. Standards have been established by the Illuminating Engineering Society[7] for the recommended light intensity in different areas of the foundry, Figure 10. These values are for elevations 30 inches above the floor level.

Lighting

From an economical standpoint, natural lighting is practical for foundry operations. Overhead diagonal natural lighting is preferred to light coming from outside windows because of the glare which results. The overhead light sources should be fitted with diffusing glass so that daylight will be distributed to all parts of the area. As for the quantity of windows, the National Safety Council[8] states that, "A useful rule is that single story industrial buildings should have a window area equal to not less than 30 per cent of the floor area".

As an auxiliary or a substitute for daylight, "color corrected" Mercury vapor lamps are recommended for foundry operations. Bulbs should always be accompanied by proper reflectors. Outstanding advantages of these Mercury vapor lamps are, (1) High light output per watt; (2) Low operating

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[7] American Standard Practice For Industrial Operations, Illuminating Engineering Society, (New York: American Standards Association, 1952), page 16.

[8] Accident Prevention Manual For Industrial Operations, National Safety Council, (Chicago: National Safety Council, 1951), page 1 - 18.

RECOMMENDED LIGHT INTENSITIES

Operating Department	Ft. c.
Cleaning	20
Core Making (fine)	50
(medium)	25
Grinding and Chipping	30
Inspecting (medium)	30
Moulding (medium)	50
(large)	30
Pouring	10
Storage	10
Shipping and Receiving	30
Cupola	10
Shake Out	10

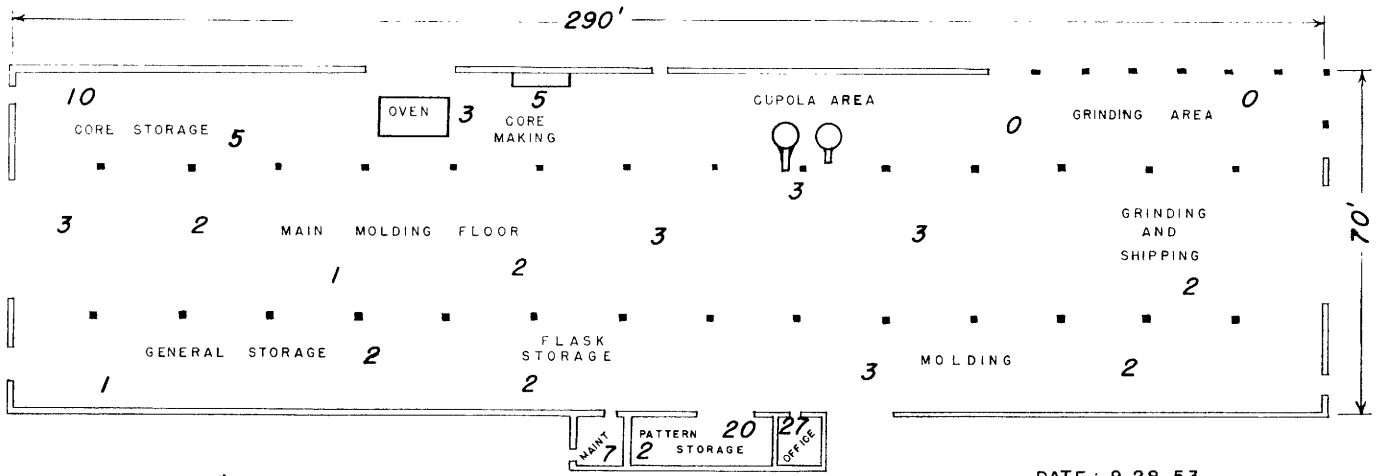
Figure 10

cost; and (3) Long bulb life. Along with these advantages, there is a possible disadvantage, it being the high installation costs because of required auxiliary equipment such as transformers and current ballasts.

Both Mabry Foundry and Machine Company and Iron Castings, Incorporated require improvements in existing lighting facilities. Figures 11, 12, 13 and 14 show light meter readings (ft. candles) taken at 30 inch levels above the floor. Two sets of readings were taken at each plant, one during normal day operations, which include molding, grinding, core making and pouring, the second set being made at night while shake out operations, the only work usually performed by the evening crew, were underway.

By comparing the existing illumination with recommended values previously indicated, it can be seen that a deficiency exists. This deficiency can be most easily overcome by the installation of permanently located Mercury vapor for daytime operations and the same type of auxiliary lighting installed on traveling cranes for night operations. Since most night work consists of shake out operations using the overhead traveling cranes, it is believed that much of the additional required light will be furnished by installing light sources along the crane bridge.

On an experimental basis, two Mercury vapor lamps have been provided near the shake out machine at Iron Castings,

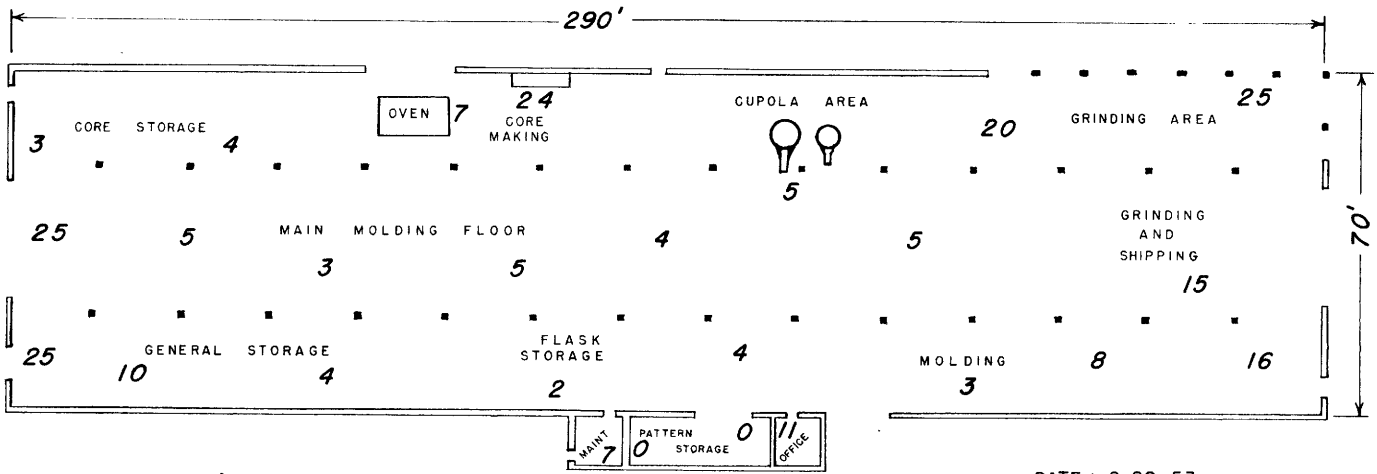


DATE : 9-28-53
TIME : 7:30 P.M.

LIGHT METER READINGS

MABRY FOUNDY
SCALE : 1" = 20'

FIGURE 11

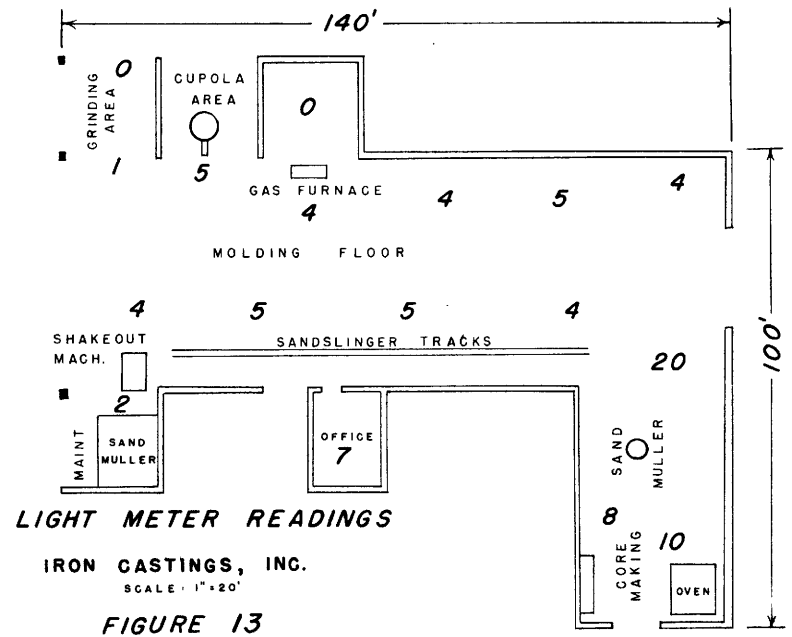


DATE : 9-28-53
TIME : 3:30 P. M.

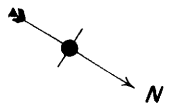
LIGHT METER READINGS

MABRY FOUNDRY
SCALE : 1" = 20'

FIGURE 12



DATE : 9-28-53
TIME : 7:15 P.M.

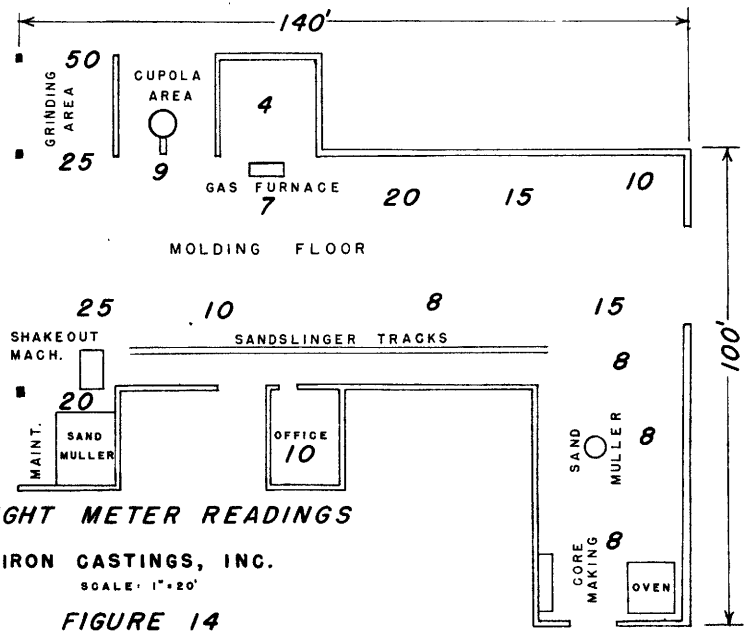


LIGHT METER READINGS

IRON CASTINGS, INC.

SCALE : 1" = 20'

FIGURE 13



DATE: 9-28-53
TIME: 4:00 P.M.

N

LIGHT METER READINGS

IRON CASTINGS, INC.

SCALE: 1"=20'

FIGURE 14

Incorporated. These lamps have proven very successful, but do not produce sufficient light intensity. The installation of a 350 watt incandescent bulb, with proper reflector, would probably supply a sufficient quantity of light for operations in this area.

Color

Closely related to good lighting is the use of industrial color schemes for increased uniform illumination and as an aid in maintaining good housekeeping conditions. The reflection of much light will be facilitated by the use of the proper colors on plant ceilings, walls, and equipment. The National Safety Council[9] says:

> White ceilings are generally recommended for maximum brightness. If the floors and equipment are rather dark, the upper walls should have a reflectance of 50 to 60 per cent. A soft blue-green is often used on walls. Floors and equipment should reflect from 25 to 40 per cent of the light.

Dark colors will absorb light, thus necessitating increased artificial illumination in order to attain the desired light intensity.

Several good color schemes have been developed and recognized as helping factors in illumination, increased production, and accident prevention. The recommended color

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[9] Ibid., page I-26.

to be used at Mabry Foundry and Machine Company and Iron Castings, Incorporated is that advocated by E. I. Du Pont de Nemours and Company (Incorporated) of Wilmington, Delaware; it closely resembles the color scheme developed by the American Standards Association and supported by the National Safety Council.

Color will have a definite psychological effect on workers. It may be used, not only as an illuminating and good housekeeping aid, but also for marking physical hazards, and indicating locations of safety equipment such as fire extinguishers and first aid stations. Color schemes do not always substitute for mechanical safeguards, but often aid in eliminating such hazards as moving parts which cannot be mechanically guarded.

E. ELECTRICAL HAZARDS

Electrical equipment is used in most every phase of foundry operations, from charging and sand mulling through molding pouring, shake out, grinding and shipping. Properly used and properly controlled, electricity presents practically no hazard whatsoever.

The first step in elimination of electrical hazards is a definite management responsibility. It is the removing of physical hazards in existence, a typical example is shown

by Figure 15. This photograph, showing an open front toggle switch box, was taken near the main molding floor of [redacted] Foundry. Electrical switch and fuse boxes and conduit lines should be marked through the use of the recommended color scheme.

Figure 15

Correct use of electrical equipment and proper maintenance of electrical facilities should be thoroughly explained

to employees of the ~~foundries concerned in this study~~ Ajax Foundry. After a thorough explanation, these correct procedures should be insisted upon by management as being essential to safe working conditions and should be considered an employee's personal responsibility.

Conclusions

CHAPTER VI

PROTECTIVE EQUIPMENT

The best method of stopping accidents is through the elimination of the hazard at the source. This is not always possible; it is therefore necessary for the workman, in contact with the hazards, to wear protective equipment or clothing. This equipment and clothing is intended to protect the workman for the period of time in which he is exposed to the hazard.

It is the responsibility of the safety director to strive for the elimination of the hazard at the source. If this is impossible he must then determine the personal protective equipment necessary. He may be aided in both the elimination of the hazards and the prescribing of personal protective equipment by the safety committee, to be discussed in Chapter X of this study.

This chapter will be concerned with, (1) outstanding mechanical protective devices, and (2) personal protective equipment now in use at Mabry Foundry and Machine Company and Iron Castings, Incorporated; it will also include a list of proposed protective equipment.

Equipment Now in Use

Mechanical Equipment

The outstanding mechanical safety device, now in use

at both foundries concerned in this study, is the equipment used in charging the cupola. It is considered as an exceptionally safe charging device. Figure 16 shows the charging device in operation. The charge is first placed in the charging bucket (1) which, in its lowest position, is slightly below ground level. The operator starts an electric hoist which pulls the charging bucket up guide rails (2) to the charging door. Automatic trips stop the charging bucket after it has entered the charging door, causing the "trap

Figure 16

door" bottom of the charging bucket to open, evenly distributing the charge over the top of the bed. The device has been in use for some time, and has proven safe, fast, and low in maintenance costs.

A second piece of equipment, briefly discussed in the previous chapter, and in use at Iron Castings, Incorporated, is the modern sand mulling machine. Mulling of sands is sometimes hazardeous because of dust conditions often produced. Through the use of this machine, sand is completely enclosed in a hopper immediately after shake out operations and is retained in the machine until it is ready to be used in molding. After shake out operations, the sand is lifted to a storage hopper above the mulling machine by a bucket conveyor. The sand is then withdrawn from the hopper and goes into the muller through an enclosed duct after the previous batch has been removed. Additional ingredients are then added to the batch (13 cu. yds.) of sand in the muller through specially designed doors.

There has been one accident in which this mulling machine was the agent. The accident was a very costly one, $3,918.00. The operator failed to use the sand sampling cone provided. Instead he attempted to remove the sample by hand; the impellers within the machine catching his hand. This accident can be wholly attributed to an unsafe act on the part of the employee and not to a failure of the machine.

Personal Protective Equipment

In order to protect the feet and lower portions of the legs, certain protective equipment is now in use. All employees are required, as a condition of employment, to wear safety shoes at all times during plant operations. For those involved in pouring operations, the ten inch quickly removable safety boot is recommended. This boot protects the feet from objects which may fall on the feet and at the same time partially protects the lower portion of the legs from hot metal splashes. Personnel not involved in hot metal operations may wear low top conventional safety shoes. If they, at any time, are required to perform an operation within the hot metal area, asbestos spats must be worn. All shake out workers and shifters are required to wear spats at all times.

Each employee at Mabry Foundry has been supplied with spectacle type safety glasses. Workmen at Iron Castings, Incorporated will be issued an identical type in the near future. These safety glasses are provided at company expense and serve as an aid in preventing the most frequent accident type, "struck by". The most common "struck by" accidents involve foreign bodies entering the eyes. Clear lens are provided in glasses issued to those in normal operations and shaded lens to pouring and furnace men. The wearing of these glasses was insisted upon by management in the beginning, but they are now accepted by the employees.

So as to provide additional protection for those involved in grinding operations, the wearing of cup type goggles is insisted upon. They are of the most modern type available full view and light weight. Figure 17 shows a properly equipped employee performing a grinding operation.

Figure 17

The amount of sand which bounces up while the sand slinger is in use necessitates facial protection. Although

a plastic face shield is recommended, similar to that shown in Figure 18, operators are given a choice between this type and cup type goggles. The face shield is recommended since it gives the most complete protection, the goggles protecting only the eyes.

Figure 18

Closely related to facial protection is the protection of the head. All cupola repair men are required, by both foundries, to wear hard hats while within the cupola. This protects the workmen from any brick, clay or other materials

which may fall from the upper portion of the cupola and hit him on the head.

At one time it was necessary for workmen to borrow respirators from one another in order to safely perform a job within a dust area. New respirators have now been provided for each employee who might come into contact with dust conditions while on the job. These respirators are designed for protection against dust through the use of a special filter. Employees are encouraged to regularly change filters.

Recommended Protective Equipment

In order to supplement personal protective equipment now in use and so as to establish a clear understanding as to the proper equipment to be used, a list of recommended personal protective equipment is included here. Upon formation of the proposed safety committee, this proposed equipment list will be presented for their approval. After approval by the committee, the safety equipment and wearing apparel as outlined will be the standard operating departmental wearing apparel and must be worn by those within the department or anyone performing operations usually carried out in the department. No employee is to be put to a task until all required equipment has been supplied.

A published list will be kept, as a reference, on the plant bulletin board at all times. The following list includes

the equipment and clothing recommended; distinguishing between that furnished by the company and that furnished by and considered personal property of the employee.

RECOMMENDED PROTECTIVE EQUIPMENT

	COMPANY	EMPLOYEE
MELTING AND CHARGING		
1. Cupola Workers	1. Goggles 2. Hard Hat 3. Respirator	1. Gloves 2. Safety Shoes
2. Charging Crew	1. Safety Glasses 2. Leggings 3. Wool Sweat Shirt	1. Gloves 2. Safety Shoes
MOLDING AND POURING LABOR		
1. Molders and Helpers	1. Safety Glasses	1. Safety Shoes
2. Hand and Overhead Ladle Pourers	1. Safety Glasses 2. Leggings 3. Hand Pads	1. Safety Shoes
3. Shifters, Dumpers, and Shake Out Men	1. Safety Glasses 2. Spats 3. Respirators	1. Safety Shoes (Shake outs without exhaust)
CORE ROOM		
1. Core Makers	1. Safety Glasses	1. Safety Shoes
2. Oven Tenders	1. Hand Pads	1. Gloves 2. Safety Shoes
3. Core Carriers and Laborers	1. Safety Glasses	1. Safety Shoes
PATTERN SHOP		
1. All Employees	1. Safety Glasses	1. Safety Shoes

	COMPANY	EMPLOYEE
SAND DEPARTMENT		
1. Muller Operators	1. Respirators	1. Safety Shoes
2. All Employees	1. Safety Glasses	1. Safety Shoes
GRINDING AND FINISHING		
1. Grinders, Chippers, Spruers, and Inspectors	1. Fireproof Aprons 2. Goggles 3. Respirators (In Designated Areas)	1. Safety Shoes
2. Laborers	1. Safety Glasses	1. Safety Shoes
MAINTENANCE AND CONSTRUCTION		
1. All Employees	1. Safety Glasses 2. Locks (Electricians and Mechanics)	1. Safety Shoes 2. Gloves
2. Construction	1. Hard Hats	1. Safety Shoes 2. Gloves
GENERAL LABOR		
1. All Employees	1. Safety Glasses 2. Respirators (When needed)	1. Safety Shoes 2. Gloves
SHIPPING		
1. All Employees	1. Safety Glasses	1. Gloves 2. Safety Shoes
SUPERVISORS		
1. All in Plant Operations	1. Safety Glasses	1. Safety Shoes

CHAPTER VII

RECOMMENDED ORGANIZATIONAL SET-UP

Organizational Chart

The recommended organizational set-up of the combined companies is one of line and functional staff organization. This type of organization was advocated by Frederick W. Taylor, the father of Scientific Management. Here the advantages of both the line and staff organization and the functional type of organization can be retained. Functional staff departments are given responsibility and authority over specialized activities such as time study, production, employment, purchasing and shipping.

This form of organization is widely used by large and small companies alike to a definite advantage because of its versatility. The three companies discussed in this report now operate as independent single operating units. It is believed that many lost motions and excess costs would be eliminated through the use of a central office, horizontal combination, operating unit. Figure 19 shows the recommended organizational chart for the combined plants.

The fact should be realized that some of the functions set up on the organization chart are performed by a single individual in plants as small as these. The versatility

of the line and functional staff organization is brought out here; this type of organization will work equally well whether several phases are performed by an individual or every phase being a different person's responsibility.

RESPONSIBILITY FOR SAFETY

Responsibility for safety cannot be delegated to any one person, because safety consciousness and responsibility must extend throughout the organization, from the highest management to the most common laborer in the plant. Everyone is concerned, because all profit from safety. The organization may, however, be broken down into four mutually concerned units; each of these must recognize accident prevention to be one of their important objectives, the four units being:

(1) Top Management

(2) Safety Director

(3) Foremen

(4) Employees

The prevention of accidents is a cooperative task important to the social and economic life of every employee. Management has its responsibilities, each employee must put forth his best efforts and the burden of detail is placed upon the shoulders of the foreman, a key man in safety.

The Responsibility of Top Management

In all cases a part of management's responsibility to his employees, concerning safety, is fixed by state law. Management which approaches safety from the compulsory angle, as required by law, will be headed for much trouble and excess expense. Accident prevention can be a form of profit to a

company, if properly supervised and encouraged. To be profitable, however, Blake[1] states:

> It is absolutely essential that top management as a whole, and the chief operating executive in particular, provide the same kind of leadership in accident prevention as they would provide in the field of production.

If this leadership does not exist at all times, the efforts of the organization will become a hit-and-miss affair; the program will fall far short of the possible results which might have been attained.

It is the responsibility of management to aid and encourage employees in preventing accidents by providing the proper safeguards in the layout of the plant, machinery, equipment, and processes used in performing their job. These safeguards should be kept in good condition at all times. Another of management's functions and prerogatives is to insist upon the proper use of the safeguards provided.

The safety consciousness of employees is a sign of good management. Top management must emphasize the importance of this consciousness on everyone in a supervisory capacity, since they are directly connected with plant operations. This safety consciousness, when properly administered, will result in a better attitude of the employee toward management,

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[1] Roland P. Blake, Industrial Safety, (New York: Prentice - Hall, 1949), 435 pp.

safety, and his job in general.

The Responsibility of the Safety Director

The safety director's role is usually one of "the middle man"; his job is to contact both management and plant workers concerning safety. He is the representative of management with the "know how" of accident prevention and shares many of the same responsibilities as top management. The safety director coordinates the program and must supply ideas and inspiration for a successful program. It is his job to work closely with the plant's supervisors by aiding them in detecting unsafe conditions, whether these conditions are concerned with employee attitude, plant layout, processes used, or mechanical safeguards. Periodic plant safety inspections are also part of his job. His method, attitudes of approach, and the ability he has to leave a favorable impression, are important in obtaining favorable results.

All records of past accidents should be kept in the office of the safety director with up to date totals analyzed according to the American Standards Association's American Recommended Practices of Compiling Industrial Accident Causes[2]. These statistics are to be used in periodic reports to management, accompanied by condensed explanations of the results of

[2] American Recommended Practice for Compiling Industrial Accident Causes, National Safety Council, (New York: American Standards Association, August 1, 1941).

the accident prevention efforts within the organization. They may also be of use in safety meetings with supervisors and workmen, but would not be effective in the form in which they were presented to management.

Perhaps his biggest job is that of a salesman and advertiser. The safety director can best sell safety through his influence and by the examples which he sets in his personal contacts. Through a form of advertising he should keep the organization informed on the progress of their combined efforts and the problems that should receive the most attention.

Many of the safety director's responsibilities may be summed up by saying that he is responsible for the three "E's" of safety as stated by Aspley and Whitmore[3]: (1) education, (2) enforcement, and (3) engineering.

The Foreman's Responsibility For Safety

It is generally agreed that the brunt of the load, in preventing accidents, rests upon the shoulders of the foreman. He is management's closest contact with those involved in most accidents, the workers. Some of his responsibilities are shared with and common to top management and the safety director; but at the same time he has a further responsibility

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[3] J. C. Aspley, E. Whitmore, The Handbook of Industrial Relations, (Chicago: The Dartnell Corporation, 1949), 1244 pp.

to his men in that he must aid them in preventing accidents. Heinrich[4] explains the position of a foreman in accident prevention by saying that: "The foreman, however, is in a particularly strategic and tremendously important position as far as attaining results in accident prevention is concerned." His situation with the workmen is unique in that from the employees' point of view the instructions given by their foreman are authoritative and final. A foreman should become acquainted with his men's habits, attitudes, personal qualities, and business qualities.

The importance of each foreman to the safety within his firm should be in his mind at all times. Keeping safety in a foreman's mind is often hard to do. He believes that safety is important and he is probably willing to cooperate with the safety director by not hindering the work of the director or safety committee, but he often does not understand the principles upon which safety stands. He and all other supervisors and representatives of management should be educated so as to have a thorough understanding of what is to be done and who is going to do it.

A foreman's job in safety may be made more pleasant, profitable, and understanding by management-sponsored or supported courses in supervision, in which safety plays its

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[4] H. W. Heinrich, Industrial Accident Prevention, (New York: McGraw-Hill Book Company, Incorporated, 1941), p. 47.

part or by courses concerned only with the supervisors' responsibility for safety. After the basic foundation has been laid, the foreman may become interested in additional reading material, lectures, and possibly safety conventions.

A meeting of all foremen should be held periodically, at which both general and specific safety problems could be discussed. These meetings may be most profitable when held with the assistance of the safety director. Although the safety director is present at most safety meetings, it is often best to have the meeting conducted by one of the foremen capable of leading such a discussion.

The foreman must remember that safety is a part of efficiency and production, and that accidents hurt his department and himself.

The Employee's Responsibility for Safety

The employee has a definite part in a safety program. He has responsibilities to fulfill which are just as important as those of top management, the safety director, and his foreman. He should cooperate in the safety movement for his own protection; for the benefit of his dependents and society in general; for the good of his fellow workers; and because of his duty to his employer who considers safety as an important part of the workman's job. Employee responsibility is described in the American Foundryman's Association publication,

Recommended Good Safety Practices For The Protection of Workers In Foundries[5], by stating that:

> It is the responsibility of employees to utilize machinery, equipment, tools, processes and safeguards in an intelligent and safe manner to the following end:
>
> (1) To protect themselves from being injured
> (2) To work in an intelligent and safe manner to protect their fellow workers from harm.

The workman lacks many of the tools which aid in accident prevention. He issues few if any orders; he is unable to purchase safety equipment, -- although he may possibly recommend that it be provided; and he has a very limited control over the actions of his fellow employees.

His main responsibility is the giving of his wholehearted cooperation to the safety program and participating in safety activities. Blake[6] outlines ten safety activities in which workmen can take an active part and in many cases be given the major role. These are:

1. Safety campaigns and contests
2. Safety meetings and safety stunts
3. First aid training
4. Plant fire brigades
5. Plant inspection
6. Accident investigation
7. Job safety analysis
8. Safety suggestion system
9. Safety inventories
10. Safety committees

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[5] Recommended Good Safety Practices For The Protection of Workers in Foundries, American Foundryman's Association, (Chicago: American Foundryman's Association, 1945), p. 9.

[6] Roland P. Blake, Industrial Safety, (New York: Prentice - Hall, 1949), p. 247.

Employees should report all unsafe conditions, beyond their control, to the superior or delegated person responsible for the correction of the condition. Individual support given to accident prevention within the plant is of the utmost importance to overall plant safety.

JURISDICTION OF THE SAFETY SECTION

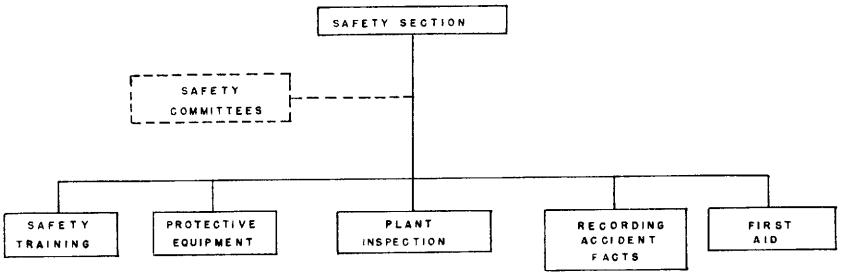
The safety section shall have jurisdiction over all company sponsored or company supported safety activities. This section, according to the proposed organizational chart, will be a part of a functional staff under the company's engineer. It will be further broken down as shown by Figure 20.

The safety director is to be management's representative in charge of the section and shall act as director and coordinator of the accident prevention program. As an aid to the safety director, it is recommended that there be a plant safety committee, acting in an advisory capacity to the director, whose function it will be to aid in solving safety problems involved in plant operation.

The safety section shall have direct jurisdiction over:

(1) Safety Meetings and Training Programs. These shall be supervised or coordinated and in most cases conducted by the safety director. Whenever practical and possible, such sessions may be lead by qualified employees, visiting specialists from other plants, or safety engineers representing the compensation insurance carrier of the two foundries.

(2) The Purchase of Protective Equipment. The purchase of such equipment will be made only after a thorough study of the operations requiring the equipment has been made



JURISDICTION OF THE SAFETY SECTION

FIGURE 20

by both the safety committee and the safety director.

(3) Periodic Plant Safety Inspections. Inspections conducted by the safety director and/or members of the safety committees shall be considered to be another jurisdictional function of the safety section. Recommendations will be made by the safety director to the proper authority, in most cases the plant manager, upon completion of the inspections.

(4) The Recording and Accumulating of Records. The recording and accumulating of records concerning accidents and methods used to aid in their prevention, is a very important factor in accident prevention and is to be under the jurisdiction of the safety director and the safety section.

(5) First Aid. The rendering of aid to employees injured slightly or as an initial treatment shall be under the jurisdiction of the safety director or someone directed by him and properly trained. The installation of a good first aid program would aid in the reduction of many costs involving "no lost time" accidents. The majority of calls to a doctor's office, involving cuts, burns, and irritations, could be eliminated.

CHAPTER VIII

RECORDING OF FUTURE ACCIDENTS

Without adequate records it is impossible to determine where the greatest time and/or expense factor of accident prevention should be applied. All accidents should be accurately reported and adequate records should be kept in order that they can be properly analyzed. The maintaining of accident records is just as important to good operating techniques as are records of payrolls, production costs, or sales. All accident records should be kept according to the standards approved by the National Safety Council. These approved methods have been established by the American Standards Association and are presented in their pamphlets Z16.1, American Standard Method of Compiling Industrial Injury Rates[1] and Z16.2, American Recommended Practice for Compiling Industrial Accident Causes[2]. Another aid in maintaining proper records is the National Safety Council's Safe Practices Pamphlet No. 21[3].

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[1] American Standard Method of Compiling Industrial Injury Rates, Part I, Z16.1, 1945, National Safety Council, American Standards Association, New York, 10 pages.

[2] American Recommended Procedures for Compiling Industrial Accident Causes, Part II, Z16.2, 1941, National Safety Council, American Standards Association, New York, 14 pages.

[3] Safe Practices Pamphlets,"Industrial Accident Records and Analysis", Safe Practices Pamphlet No. 21, (Chicago: National Safety Council, 1946), 19 pages.

Future accidents are to be divided into two classes:

(1) First aid or "no-lost-time" cases

(2) Lost time cases

First Aid Cases

Minor injuries involving no lost time and medical costs up to $15.00 shall be paid by the company directly to those rendering services. Such cases shall be reported by the injured man's supervisor to the safety director by supplying him with the original and one copy of the "Foreman's Report of No-lost-time Injury", Figure 21. The safety director shall retain the original for his records, the copy shall be placed in the employee's personal file which is kept in the offices of the safety director. Information taken from these reports is to be placed on the employee's "Office Information and Safety Card" to be further described in this chapter, all expenses being entered under the medical costs column on the reverse side of the card. The information included on the "Foreman's Report of No-lost-time Injury" is to be complete, accurate, and clear in order that a proper analysis might be made and included in the accumulation of accident records.

Lost Time Injuries

All cases involving lost time by the employee, as stated in the Texas Workman's Compensation Law, or those "no-lost-time" accidents resulting in costs of over $15.00 shall

FOREMAN'S REPORT OF "NO-LOST-TIME" INJURY Date _____

Plant _____

Name _____ Clock No. _____

Employed as _____ Foreman _____

Date of Injury _____ Time _____ a.m. p.m.

Nature of Injury _____

_____

Sent: Back to work _____ First Aid _____ Doctor _____

Hospital _____ Home _____

Complete Description of Accident: _____

_____

_____

(write additional information on back)

Cost _____

Figure 21

be reported to the safety director on the "Standard Form For Employer's First Report of Injury". Five such reports shall be furnished the safety director.

The original and first two copies of "First Report of Injury" shall be forwarded to the compensation insurance carrier, one of these is to be sent by the compensation carrier to the Industrial Accident Board, Austin, Texas, the other two being retained for the carrier's use. The third copy is to be kept in the files of the safety director. The fourth copy is to become a permanent part of the employee's personal company file.

A record of these lost time accidents is to be entered onto the employee's "Office Information and Safety Card", previously referred to, and to be further discussed in this chapter.

The "Standard Form For Employer's First Report of Injury" is included in Appendix II of this study. That information included under the sections covering "Cause of Injury" and "Nature of Injury" is of the utmost importance in proper accident analysis. It is necessary to have such information in order than an analysis might be made according to the American Standards Association recommended methods.

Office Information and Safety Card

As an aid to the office personnel at Iron Castings,

Incorporated and Mabry Foundry and Machine Company, it is recommended that "Office Information and Safety Cards" be kept on each employee. These cards are to be retained in the files of the individual plants.

This card shall contain all information indicated in Figure 22. Such personal data is necessary to office records and is of assistance in general office operations such as payroll, locating employees at home, retail merchant transactions between employees and retail stores, etc.

On the reverse side of the card shall be space provided for a record of the individual's accidents, as shown in Figure 23. The first column is to be used for dates on which accidents occurred, the second to describe the accident, the third and fourth to indicate the costs incurred from the accident. The cost columns will include medical costs and compensation costs.

Colored metal tabs are to be used on the "Office Information and Safety Card" indicating the part of the body involved in each accident. Each part of the body will be designated by a tab of different color or combination of colors. Figure 24 gives the color code to be used.

By studying these cards one may determine such information as the number of accidents in which an employee has been involved, what part of the body was involved in the

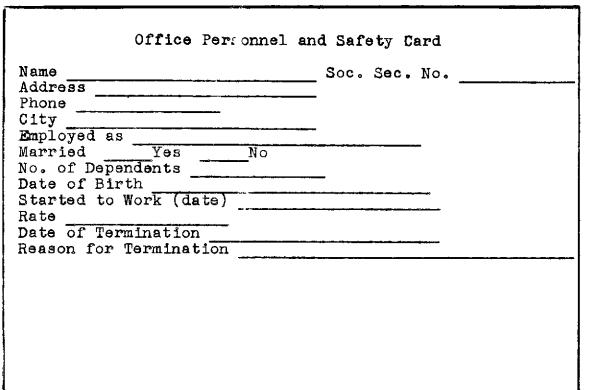
Office Personnel and Safety Card
Name
Soc. Sec. No.
Address
Phone
City
Employed as
Married
Yes
No
No. of Dependents
Date of Birth
Started to Work (date)
Rate
Date of Termination
Reason for Termination

Figure 22

Accident Records		Costs	
Dates	Descriptions	Med.	Comp.

Figure 23

accidents, and what the injured person was doing at the time the accident occurred. These are valuable factors in employee placement and training and the overall aspects of accident prevention.

COLOR CODE FOR OFFICE
SAFETY AND INFORMATION CARD FILE

Head	-	Black and white
Eyes	-	Black
Trunk	-	Blue
Arms	-	Green
Hands	-	Green and orange
Fingers	-	Green and yellow
Legs	-	Red
Feet	-	Red and orange
Toes	-	Red and yellow
General	-	White

Figure 24

CHAPTER IX

PROPOSED SAFETY EDUCATION PROGRAM

Safety education, in its simplest terms, is the instructions given a workman by the supervisor concerning the best and safest way to perform his job; however, all employees are concerned from top management to the lowest workman. A factor of major importance in accident prevention administration is the training of supervisors and workmen in the application of safety methods to their jobs. The chief purpose of safety meetings being to present useful information to employees, with emphasis on accident prevention. They are usually informal, those present being encouraged to bring forth their ideas and enter into discussions. Safety meetings are important in creating and maintaining proper attitudes. Poor attitudes are believed to be the causes of the majority of all accidents at Mabry Foundry and Machine Company and Iron Castings, Incorporated. Regular meetings are vital to the successful safety program. Meetings first and foremost must be interesting to those present, if full cooperation is to be attained.

Management Safety Meetings

A standard practice at the two foundries being studied and Beaumont Machine Works, the associated machine shop, is

to hold top management meetings every Saturday morning. If at all possible, all members of top management are expected to be present. The management of the three companies meet and hold a "round table" discussion on any problems effecting either of the companies individually or any combination of the three. General foremen are included in the meetings. The length of such meetings range from only a few minutes to an hour or more.

These weekly meetings present an excellent time for discussing safety as it concerns those present. Periodic reports of the safety director should be made at this time. He should briefly discuss at least one problem of interest to the group and at the same time ask for any questions concerning the safety program.

Foreman Safety Meetings

Because of the important position of foremen in preventing accidents, periodic meetings are necessary. Although general foremen are present at management meetings, it is desirable to hold regular meetings of general and sub-foremen. These are most profitable when held a few days before general shop safety meetings, in order that the information to be presented might be discussed. The foreman's part in the general meetings should also be explained at this time. The accidents to be discussed at the meetings should be brought to the fore-

man's attention before they are discussed with workmen.

These meetings, although usually lasting no more than one hour, present excellent opportunities for explaining the supervisor's responsibility for accident prevention. A more desirable method of expressing the supervisor's responsibility is through formalized general training programs for supervisors or through specific courses dealing with responsibility for safety. Such programs are sometimes difficult to conduct until first an ardent interest in safety is instilled in the supervisors.

Shop and Office Personnel Meetings

The real "pay off" for safety training comes through interest shown by the workmen. This interest should be created through every contact between the workmen and the safety director. The employee out in the plant is the person most commonly involved in accidents, thus proper training and attitudes are of the utmost importance. Meetings of the shop and office personnel will, in most cases, include the entire plant because the plants concerned here are small. In the beginning, it will be necessary to hold small group meetings with those performing specific operations and also general plant meetings. These small group meetings

are important since materials discussed will be of a specific nature and be related to specific operations.

The meetings of general plant personnel will be somewhat more general than the smaller group meetings. Meetings of this type should be held twice monthly or possibly more regularly until the proposed accident program has been sold to the employees. Unless interest is built up and maintained through progress, which the employees can see, the program cannot be a success.

Although general group meetings are designed to last approximately fifteen to thirty minutes, useful information can be discussed in this short period. Longer meetings are discouraged since the men may get tired listening and will remember little of the information presented.

A suggested outline to be followed is presented here. Such an outline should be formulated in planning a meeting and should be followed by the chairman. Accurate records of proceedings are vital to further action on information discussed.

Proposed General Plant Safety Meeting Outline

I. Calling of meeting to order by the chairman.
II. Introduction of guests present.
III. Making of special announcements
IV. Reports from safety committee or special committee members

V. Discussion of accidents occurring since last general meeting

VI. Presentation of main topic

VII. Employee question period over topic discussed

VIII. Concluding remarks by chairman

IX. Closing of meeting

Suggested Possible Main Topic Outlines

In order to assist the safety director in the conducting of a safety education program, twelve topics are outlined here for possible presentation at general safety meetings. An additional twelve topics are suggested as supplementary material. The order of presentation given is considered to be a logical sequence of presentation.

I. Introduction to Safety and Accident Prevention

A. Definition of an accident

1. Example of accident -- no injury

2. Example of accident -- injury results

B. Advantages of accident prevention

1. To employee and his family

2. To his company

3. To society

C. What causes accidents

1. Mental attitudes

2. Physical hazards

D. Ways in which everyone can help

1. Cooperation with suggestions made by safety director
2. Reporting hazards
3. Using protective equipment
4. Teaching and/or explaining safe practices to fellow employees

II. Responsibility For Accident Prevention

A. Top Management

1. Show interest
2. Eliminate hazards
3. Provide portion of protective equipment

B. Safety Director

1. Making suggestions to men in the shop and to management
2. Conduct training programs
3. Keep accident records
4. Coordinate program

C. Foreman

1. Aid in training workers
2. Reminds workers of proper procedures when unsafe practices are being followed
3. Aids in eliminating hazards
4. Reports injuries

D. Employees

1. Cooperate with suggestions made
2. Use equipment correctly
3. Report hazards and suggest improvements
4. Aiding fellow employees

III. Safety Committees

A. Purpose

1. Represent shop employees concerning safety problems
2. Make suggestions to management
   a. from plant inspections
   b. from accident reports
   c. from personal observations
   d. from observations of fellow employees
3. Help fellow employees
   a. old employees
   b. new employees
4. Understand problems involved in accident prevention

B. Members

1. How selected
2. Who shall be members
3. Length of service

IV. Accident Costs

A. Direct Costs

1. Medical costs

2. Compensation costs

B. Indirect Costs

1. Cost of lost time to injured employee

2. Cost of time lost by other employees because of:

a. curiosity

b. rendering assistance

c. resulting nervousness

3. Cost of time lost by foreman and other supervisors

4. Costs due to damaged machinery, tools and spoilage of materials.

5. Costs due to interruption of production.

V. Safety Rules and Regulations

A. Purpose is to eliminate:

1. Misunderstandings

2. Disorder

3. Accidents

B. Composed by

C. Presentation and explanation

D. Vote of acceptance by employees

VI. Eye Protection

A. When should eye protection be worn?

B. Types of eye protection

1. Spectacle type

a. clear

b. shaded

2. Goggles

3. Face shields

a. sand slinger

b. welding

C. Fogging of glasses

D. Individual fitting

E. Cleaning, sterilizing, and maintenance

VII. Workmen's Compensation

(Distribution, reading and discussion of condensed material covering workmen's compensation. Suggested material included here in Appendix III was prepared by the Texas Employer's Insurance Association of Dallas, Texas.)

VIII. Manual Materials Handling

A. Correct procedure of lifting

B. Number of accidents occurring during manual handling operations

C. Recommended lifting loads per man

D. Team lifting

E. Have workmen try lifting according to recommended procedures, individually and in teams

IX. Good Housekeeping

A. Items Covered by Good Housekeeping:

1. Loose materials and objects
2. Piling
3. Disposal of scrap and waste
4. Tool housekeeping
5. Window cleanliness
6. General cleanliness and orderliness

B. Importance of Good Housekeeping

1. Prevents falls and tripping accidents
2. Conserves valuable space, time and materials
3. Improves overall working conditions

C. Housekeeping aids

1. Set procedures of operation
2. Proper storage areas
3. Color schemes

X. Safety Shoes

(It is recommended that a safety shoe salesman be invited into the plant and present the discussion. This is practical since a mobile safety shoe unit visits each plant approximately once each month.)

A. Number of foot injuries

B. Recommended types

C. Construction of safety shoes

D. Safety shoe costs

1. Initial costs

2. Methods of making payments by purchasing safety shoes through the company

XI. Mechanical Materials Handling

A. Advantages of mechanical lifting

1. Production increases

2. Ease in handling

3. Accident decreasing

B. Hazards involved

1. Proper operating procedures

2. Improper maintenance

C. Instruction in proper signals used in connection with overhead traveling cranes

D. Correct method of attaching materials to lifting device

E. Operating speeds

1. Cranes

2. Power vehicles

XII. The Company and It's Employees

A. Who makes it possible for the company to operate?

1. Customers
2. Employees
3. Management
4. Stockholders

B. How the company operates
1. Operating costs
2. Profits

C. What company owes the employee
1. Good wages
2. Good working conditions
3. Proper attitudes

D. What employees owe the company
1. Fair days work
2. Proper regard for tools and equipment
3. Respect for supervisors
4. Safe working practices
5. Overall cooperative attitudes

Additional suggested topics to be discussed at general plant safety meetings:

XIII. Leg and Hand Protection
XIV. A Proposed Safety Contest
XV. Electrical Hazards
XVI. Proper Pouring Methods
XVII. Safe Grinding Procedures
XVIII. Off-the-job Safety
XIX. Importance of Proper Training and Pride of

CHAPTER X

THE SAFETY COMMITTEE

To give the employee an opportunity to help himself and his fellow employees, to let him feel that his opinions on many management functions are appreciated, and at the same time increase his interest in accident prevention, the establishment of safety committees is recommended. An employee, interested in safety, can be of much help to the safety director and to top management, not only from his suggestions to management, but by his suggestions and examples concerning his fellow employees. His interest will be transmitted to others in the plant whose cooperation may be lacking; he would therefore aid in attaining a very necessary factor of accident prevention, the interest and cooperation of everyone concerned with plant operations. Although a committee of workers whose purpose it is to aid in accident prevention is good, Blake[1] points out the fact that, "A committee will take its work seriously in proportion to management's attitude toward it."

Purpose and Jurisdiction of the Safety Committee

The safety committee can and should play an intricate

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[1] Roland P. Blake, Industrial Safety, (New York: Prentice-Hall, Inc., 1949), page 270.

part in an accident prevention program. The purposes of such a committee, as stated by the National Safety Council[2], are:

(1) To arouse and maintain the interest of superintendents, foremen, etc., and do away with the idea that "Safety is the business of the safety department only".

(2) To arouse and maintain the interest of workmen and convince them that they are largely responsible for accidents and that their cooperation is needed to prevent them.

(3) To make safety activities an integral part of all operating policies and methods and in reality an operating function.

(4) To promote an opportunity for the free discussion of accident problems and the advancement of ways and means for accident prevention.

(5) To improve the cooperative spirit between management and employees. No safety program will secure maximum results unless the rank and file of the workers have an intelligent understanding of the problem and at the same time have some responsibility for making the program effective.

(6) To assist the operating manager in studying the value of safety suggestions.

Although these statements are brief, they cover a wide range of possibilities for which the safety committee may be used. It must be emphasized that this committee does not represent or replace management, but is an employee's committee repre-

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[2] Safe Practices Pamphlets, "Safety Committees", Safe Practices Pamphlet No. 72, (Chicago: National Safety Council, 1939), page 1.

senting the workmen.

Meetings of the safety committee will be held once each month. The meetings should be limited, if at all possible, to approximately thirty minutes. The chairman of safety committee meetings shall be the safety director. He is to be management's top representative and all actions taken by the committee will be his responsibility, since the committee acts only in an advisory capacity as explained in the chapter covering "Organizational Set-Up of the Safety Section".

Monthly inspections of plant facilities are to be conducted by each member of the safety committee. His recommendations are to be submitted, in writing, to the safety director at least one week previous to the monthly meeting of the committee. Inspections are to be thorough and any recommendations made should be in the form of constructive criticism.

A member of the safety committee has the opportunity to help the new employee on a job. He can be helpful by explaining the proper method of performing an operation or seeing to it that the new man is properly instructed. Explaining safety rules is also important to the new man, and can be effectively carried out by an older employee, familiar with the rules of the company. Perhaps the outstanding responsibility of all employees and especially those serving on the safety committee at the time, is to be friendly and

set good example for the new man to follow.

At times, members of the safety committee may be called upon to aid in the investigation of accidents. This is especially advantageous when the investigation is made by someone familiar with the operation that was being performed at the time the accident occurred. Although the investigation may be carried on by an employee, the assigning of responsibility or fault for an accident is often an unpleasant task and should not be placed upon the shoulders of a fellow worker of the injured employee. The placing of responsibility of fault is a function of the safety director.

Safety Committee Members

Every employee should be given an opportunity to be a member of the safety committee, at one time or another. There shall be a safety committee, complete within itself and functioning separately for each plant involved in this study. It may sometimes be advantageous, however, to have combined meetings of the committee from each foundry. The safety director shall determine the necessity, time and place of such meetings.

A committee shall consist of six members. Two of these, the safety director and the general foreman, shall be permanent members; the remaining four shall be appointed, with the individual's approval, by the general foreman. The

four nonpermanent members shall be selected from the operating plant. One shall be a molder or molder's helper. Another shall be an employee whose regular duties may involve grinding, pouring, charging, sand preparation, and/or cupola tending. The third and fourth members are to be selected from the general plant; preferably persons involved in operations which may bring him into contact with a variety of plant procedures, i.e., supply yard work, utility man, transportation, and/or maintenance.

In selecting members, the general foreman must show no favoritism, but select those interested and willing to cooperate and put forth their best efforts. No coercion shall be used since a program properly conducted by management, will find a large majority of the employees very eager to serve as committee members.

At the beginning of the accident prevention program, it will be necessary to describe the reasons for and functions of the safety committee to all employees. This can best be done at a general plant safety meeting. Further explanation, by the general foreman, may be necessary when an employee is contacted concerning the possibility of his serving as a member of the committee.

Rotation of Members

Each of the four rotating members will serve for a

period of four months. The member having been on the committee longest shall be replaced upon the completion of his four month tenure. No nonpermanent member may be reappointed less than eight months after the date of his last previous appointment.

During the first four months in which the program is in operation, it is recommended that one member of the original committee be replaced each month by a new member who will serve a complete tenure. The original member to be replaced will be determined by the "chance picking" of names.

CHAPTER XI

COMPANY RULES AND POLICIES REGARDING SAFETY

Top management, safety specialist, labor organizations, and the working man accept the concept that set regulations governing safety within a plant's activities are desirable. The rules should be developed in the form of positive statements which are somewhat more effective than the negative approach. Lippert's[1] opinion of safety rules is that, "All in all, safety rules and regulations should be regarded as a training aid or follow-up method".

The rules presented here were organized by the author during his employment by the two companies involved in the study. At this writing, the rules are being used in labor negotiations between the American Federation of Labor and the Mabry Foundry and Machine Company. They will also be involved in labor relations negotiations between this same labor organization and Iron Castings, Incorporated, when bargaining begins, concerning a labor contract between the two.

Some of the rules are now in effect at the two foundries but they have never been formally written or adopted. Their

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[1] Frederick G. Lippert, Accident Prevention Administration, (New York: McGraw-Hill Book Company, Incorporated, 1947), page 106.

adoption will be recommended to the safety committee, representing the employees, at the beginning of the proposed accident prevention program. After final approval, copies shall be made of the safety rules and regulations. These will be distributed to each employee of the plant at a safety meeting devoted to the discussion and explanation of this material. A copy of the rules shall be given to each new employee, with a thorough explanation of their meaning, before he goes to work.

The rules and regulations presented here refer to Mabry Foundry and Machine Company. The policies of Iron Castings, Incorporated shall be the same and reference to the particular company concerned will be made in the introductory paragraph concerned with "Accident Rules and Regulations".

ACCIDENT RULES AND REGULATIONS

In order to provide safe working conditions for the employees of Mabry Foundry and Machine Company, it is necessary that there be a clear understanding of the responsibilities and corresponding duties involved in accident prevention at this plant. The following paragraphs shall be considered by all concerned to be the governing safety regulations of the above mentioned company.

I.

A pre-employment physical examination will be required of each employee. This examination will be at the company's expense.

II.

All injuries requiring medical attention must be reported to the supervisor at once.

III.

Any unsafe act on the part of a fellow worker is to be reported to the supervisor.

IV.

The presence of a hazard, due to any cause, must be promptly reported to the supervisor.

V.

It shall be the duty of the immediate supervisor to file a written report of any accident or hazard to the

Safety Director within forty-eight (48) hours after he has become aware of the fact.

VI.

It shall be the duty of each employee to assist the company in maintaining clean, neat, and safe working conditions. It must be emphasized that good "housekeeping" is the responsibility of all employees.

VII.

Meetings will be held twice monthly or whenever the Safety Director considers necessary, at which time safety will be discussed. These meetings will be approximately fifteen (15) minutes in length and will be conducted on company time. They will be planned by the company with occasional aid from the compensation insurance carrier.

VIII.

A committee will be selected from the shop personnel to recommend and encourage safe practices. Their recommendations will be made to the Safety Director and they are to be responsible for their actions to him. The shop employees of this committee shall be rotated every four (4) months.

IX.

Protective equipment, other than safety shoes and gloves shall be provided by the company. The equipment necessary will be determined after an analysis of the hazard has been made by a representative of management and the

safety committee. Final decisions as to quantity and type of such protective equipment shall be considered a management prerogative.

X.

Eye protection, of the spectacle type, will be required at all times during plant operation. These safety glasses will be provided by the company.

XI.

Safety shoes are to be worn by shop employees at all times during plant operation. They shall be purchased by the employee and shall be a condition of employment.

XII.

Leather gloves shall be worn by all employees involved in materials handling.

XIII.

The operator of the "sand slinger" shall wear a face shield at all times while the machine is in operation.

XIV.

Goggles shall be worn at all times while in or near chipping, cleaning, and/or grinding area.

XV.

Shaped goggles shall be worn by the cupola tender while "tapping out".

XVI.

Respirators shall be provided and must be worn in dust areas.

XVII.

Failure of employees to comply with these rules and regulations will result in a warning from the Safety Director; the second offense will result in a layoff of three (3) days duration without pay; the third offense will result in an immediate and permanent dismissal.

XVIII.

Each employee is expected to participate wholeheartedly in the prevention of accidents. It is everyone's responsibility to use the machinery, equipment, tools, processes and safeguards provided in an intelligent manner so as:

(1) To protect themselves from being injured

(2) To work in an intelligent and safe manner to protect their fellow workers from harm.

XIX.

In the above paragraphs the work "supervisor" shall be defined as the immediate superior to the employee. The "supervisor" shall be a representative of management.

Some people say that anything second hand is not good; but the best second hand buy you can make is a used safety rule.

A careful worker is the best known Safety Device.

CHAPTER XII

IMPLICATIONS AND RECOMMENDATIONS

The previous accident records, hazards now in existence, and operating premium rates indicate that an accident prevention program is definitely desirable at the Mabry Foundry and Machine Company and Iron Castings, Incorporated. Such a program as is recommended here cannot be put into effect over a few days or weeks. Although the recommended program is basic in nature, several months will be required for its full installation and acceptance by the employees. It is desirable for accident prevention to gradually become a part of plant operations so as to allow all personnel to become interested. This interest should spring from the visible advantages which are produced. Employees should not feel that the program is being forced upon them.

In order to firmly establish the program, definite actions must be taken in the order of their importance. A phase should not be introduced by the safety director, who will be the coordinator, until all of its details have been thoroughly planned. The following steps are recommended for installing the basic program.

I. Program Organization

The basic materials needed for the installation of an accident prevention program should be organized by the safety director. A program without organization results in undesirable effects that will add to the problems in existence at the time. An important part of the basic materials will be an analysis of past accidents.

II. Selling Safety to Management

Without the full support of management, no program of accident prevention can hope to succeed. Management can be sold on safety only by convincing them of the benefits that will result.

III. Selling Safety to the Supervisors

Since the supervisor has direct contact with the workmen his is of the utmost importance in a safety program. A supervisor who lacks interest in safety will pass his attitudes on to shop employees, the personnel usually involved in accidents.

IV. Educating Supervisors to Safety

In order that the supervisor may correctly attack the problem of accident prevention, he should be familiar with its meaning, importance and the procedures used.

This may be accomplished through a few concentrated explanatory sessions, conducted by the safety director, or a detailed educational program covering the supervisor's responsibility for safety may be started and is highly desirable.

V. Thorough Plant Inspection

A thorough plant inspection should be made by the foreman, with the assistance of the safety director. All mechanical hazards, improper procedures, and possible corrective measures should be recorded.

VI. Elimination of Existing Mechanical Hazards

Upon the completion of the inspection of plant facilities, the safety director should meet with the supervisors and determine which recommendations should be carried out first. The supervisors should then be given the right to carry out the procedures approved. It may be necessary to report such items as guard installation, machine repair, and proper marking of hazards to the maintenance department. All hazards should be eliminated according to accepted procedures recommended by competent sources such as state agencies, insurance companies, and the National Safety Council.

VII. Provide Desirable Personal Protective Equipment

As a result of the plant inspection, the need for certain personal protective equipment will be obvious. The proper quality and quantity of such equipment should be furnished the workmen. Additional personal protective equipment may be necessary upon a thorough study of each job.

VIII. Make General Announcement of Program

After the company has put forth its best efforts to show that it will support a program for preventing accidents, the employees should be notified of the intended program. This announcement should come in the form of a bulletin board announcement, a letter attached to the employees' pay checks and should be announced at a mass meeting of all employees.

IX. Begin Safety Education of Workmen

The education of workmen in the proper procedures to follow in performing their jobs is very important. Although meetings at which safety is discussed are necessary, they are not the only educational aid used in creating and maintaining employee interest. Such items as safety contests, posters, warning signs, pay envelope enclosures, and suggestion systems are also helpful.

X. Formation of the Safety Committee

The safety committee will have two main purposes, (1) To assist the safety director through suggestions, inspections, and good example and (2) To create in the employees a sense of interest in safety by giving them the opportunity to directly participate in accident prevention. The committee is to consist of six members, the foreman, safety director and four volunteer shop employees. Each member shall serve for a period of four months. Meetings of the safety committee will be held monthly.

XI. Consider Possible Changes

Because of suggestions made by the safety committee and from observations of the safety director, it may be desirable to make certain limited changes in the program. The changes should be given much thought before they are put into effect. Additional hazards which have been observed should be eliminated at this point. It may also be desirable to secure additional personal protective equipment.

XII. Continuing the Safety Program

Accident prevention is a continuing activity. Problems are constantly arising and emphasis on safety is a necessity, never ending function of those concerned with

it. The program will realize benefits, proportional to interest shown, for both management and employees.

REPORT

OF THE

INDUSTRIAL ACCIDENT BOARD OF TEXAS

FOR THE FISCAL YEAR ENDING AUGUST 31, 1954

RESPECTFULLY SUBMITTED:

CHAIRMAN

MEMBER

MEMBER

SECRETARY

To His Excellency,
Allan Shivers,
Governor of Texas.

To Honorable C. H. Cavness,
State Auditor of Texas.

To the Honorable Legislative Budget Board
of the State of Texas.

THE FOLLOWING IS HEREBY RESPECTFULLY SUBMITTED AS A REPORT OF THE INDUSTRIAL ACCIDENT BOARD OF TEXAS FOR THE FISCAL YEAR ENDING AUGUST 31, 1954.

NUMBER OF ACCIDENTS REPORTED		224,933
NUMBER OF CLAIMS HANDLED		49,266
NUMBER OF FATAL CLAIMS HANDLED		549
CLAIMS SET FOR HEARING		13,733
NUMBER OF AWARDS ISSUED		7,175
AMOUNT OF BOARD'S AWARDS		$6,136,841.72
AWARDS FOR WHICH NO NOTICE OF INTENTION TO APPEAL WERE FILED		529
NOTICES FROM CLAIMANTS OF INTENTION TO APPEAL BOARD'S AWARD	5,003	
NOTICES FROM INSURANCE COMPANIES OF INTENTION TO APPEAL BOARD'S AWARD	301	
AWARDS FOR WHICH NOTICES OF INTENTION TO APPEAL RECEIVED FROM BOTH PARTIES	831	
TOTAL AWARDS FOR WHICH NOTICES OF INTENTION TO APPEAL RECEIVED		6,135
AWARDS APPEALED BY BOTH PARTIES		831
NOTICES OF SUIT FILED BY CLAIMANT	4,632	
NOTICES OF SUIT FILED BY INSURANCE COMPANIES	161	
TOTAL NOTICES OF SUIT FILED IN COURT		4,793
CLAIMS SETTLED BY COMPROMISE SETTLEMENT AGREEMENT AFTER BOARD'S AWARD		810

NOTICES RECEIVED OF AGREED JUDGMENTS IN COURT		
FOR AWARDS ENTERED SEPT. 1, 1952 TO SEPT. 1, 1953	988	
FOR AWARDS ENTERED SEPT. 1, 1953 TO SEPT. 1, 1954	2,192	
TOTAL AGREED JUDGMENTS RECEIVED		3,180
NOTICES RECEIVED OF JUDGMENTS IN CONSTESTED CASES		
FOR AWARDS ENTERED SEPT. 1, 1952 TO SEPT. 1, 1953	49	
FOR AWARDS ENTERED SEPT. 1, 1953 TO SEPT. 1, 1954	73	
TOTAL JUDGMENTS IN CONTESTED CASES RECEIVED		112
NOTICES OF ALL CASES DISPOSED OF IN COURT		3,292
SETTLED UNDER BOARD'S JURISDICTION WITHOUT APPEALING TO COURT		1,339
OTHER CASES SETTLED BY COMPROMISE SETTLEMENT AGREEMENT		33,046
TOTAL AMOUNT PAID TO CLAIMANT BY COMPROMISE SETTLEMENT AGREEMENT		$15,641,746.45
NUMBER OF CASES SETTLED BY LUMP SUM AGREEMENT		182
TOTAL AMOUNT PAID TO CLAIMANTS BY LUMP SUM AGREEMENTS		$807,155.07
OTHER CLAIMS PAID OFF OR OTHERWISE HANDLED BEFORE BOARD		8,853
TOTAL OF ALL CLAIMS SETTLED OR PAID OFF UNDER THE JURISDICTION OF THE BOARD		43,430
NUMBER OF INSURANCE COMPANIES DOING BUSINESS BEFORE THE BOARD		171
MONEY RECEIVED FOR CERTIFIED COPIES AND PAID INTO THE STATE TREASURY		$44,130.00

STATEMENT SHOWING MONEY EXPENDED BY THE INDUSTRIAL ACCIDENT BOARD

FOR THE FISCAL YEAR ENDING AUGUST 31, 1954

	AMOUNT APPROPRIATED	AMOUNT EXPENDED	AMOUNT TO LAPSE
SALARIES	$129,645.00	$129,155.56	$489.44*
TRAVEL	2,000.00	2,000.00	0
BOOKS, SUPPLIES, PRINTING, MEMBERSHIP DUES, FURNITURE AND FIXTURES, POSTAGE, EXPRESS, TELEPHONE, TELEGRAPH, CONTINGENT EXPENSE AND EMPLOYMENT OF PHYSICIANS	14,065.00	14,065.00	0
DEFICIENCY APPROPRIATION ALLOWED BY GOVERNOR	1,500.00	1,490.10	9.90

* 486.05 LAPSED BOARD'S MEMBER'S SALARY BECAUSE OF VACANCY ON THE BOARD.

SUPPLIES INVENTORY SEPTEMBER 1, 1954

ACCIDENT REPORT CARDS	7,000	$44.52
ACCOUNT BOOKS	3	6.80
AFFIDAVIT & STATEMENT IN SUPPORT OF CLAIM	1,500	9.75
CARDS, G. C.	2,500	5.77
CARDS, INDEX	25,000	15.35
DOCKET SHEETS - SMALL	400	7.32
DOCKET SHEETS - LARGE	150	6.05
ENVELOPES	5,300	326.17
FATAL COVER LETTERS	4,000	13.88
FLUORESCENT TUBES	3	2.31
INK, DUPLICATOR	2 LBS.	5.00
INK, ERADICATOR	6 BOTTLES	1.50
INK, STAMP PAD	5 BOTTLES	1.15
LETTER HEADS, BOND	2,000	7.96
LETTER HEADS, MIMEO	29,000	76.27
LETTER HEADS, ONION SKIN	1,000	3.58
NOTICE OF FATAL INJURY FORMS	4,500	18.26
NOTICE OF HEARING	2,880	251.54
OUT CARDS	1,500	48.00
PAPER, CARBON	28 BOXES	38.08
PAPER, LEGAL BOND	25 REAMS	28.25
PAPER, LETTER BOND	5 REAMS	4.35
PAPER, MIMEOGRAPH, LETTER	2 REAMS	1.76
PAPER, ONION SKIN, LEGAL	30 REAMS	27.30
PAPER, TOWELS	1/3 OF CASE	1.11
PENCILS	1½ DOZEN	8.80
RUBBER STAMP WITH REMOVABLE DATES	1	4.20

Scratch Pads	2	Gross	26.40
Soap	1/4	of Case	1.40
Stamp Pads, Rubber	6		3.27
Tape, Scotch	16	Rolls	7.32
Toilet Tissue	5½	Cases	31.81
Tracer Cards	2,986		34.18
Twine, Binder	1	Roll	3.31
Typewriter Clearer	4	Bottles	1.92
Typewriter Keys, Rubber	1	Set	2.70
Typewriter Ribbons	1	Dozen	8.35
			$1,086.69

Postage Inventory (Meter) August 31, 1954 - - - - - - - 1.19
Fixed Assets Inventory (in total) - - - - - - - - - $42,541.69
Bonded Employees - - - - - - - - - - - - None

PERSONNEL	EMPLOYMENT	VACATION	SICK LEAVE	LEAVE OF ABSENCE
Anderson, Betty Lou	6-8-53	7	5½	
Becker, Walita B.	5-2-52	10	5½	
Burch, Viola J.	9-1-49	7		
Cameron, Lucille	8-8-50	8½	6½	
Carlton, Wm. Leonard	4-16-46			
Childs, Isabella	4-1-50	10	4	
Connell, Helen J.	9-1-53 - 2-8-54		3	
Cox, Helen	3-4-52	10	6	
Culbertson, Frances	3-17-52	8	11	
Cunningham, Catherine	10-1-47	10	1½	
Downs, Obera	9-3-53 - 12-11-53		1½	
Duty, Ruth	7-1-50	7	14	
Early, Thelma	7-9-52	8	9	
Favors, Johnnie	4-23-52	10	10½	
Flewellen, L. H.	3-16-46			
Foster, Inez	1 -- 43	0	0	
Freeman, Patricia J.	12-14-53 - 4-16-54		5½	
French, Irene	5-15-50	10	6	
Gorder, Jimmie	4-3-52 - 3-31-54	6	6	
Greer, Joan	8-21-52	10	5	
Groos, Toni	5-21-51	16	5½	
Grundman, Helen	10-27-52	10	2½	
Harwell, Nina C.	8-3-53	10	6	
Hill, Robert L.	11-1-51 - 4-15-54			
Hobgood, Pauline	4-23-52	3	6	
Houser, Helen	4-2-52	8	13	
Ivory, Willie	6-1-53	10	5½	
Jennings, Lemore	12-16-53	5		
Kummer, Robert W.	8-9-54		½	
Lassberg, Marlene	4-7-54 - 4-30-54			
Leonard, Louine M.	8-24-45	5	2½	
Martin, Lela	5-3-49	10	3½	
Matthews, Angeline	6-4-52 - 9-30-54	10	8	
McTeer, Martha L.	5-7-54		1	
Melton, Norma Faye	6-1-53 - 11-30-53			
Moerbe, Katherine	11-15-46	10	2½	
Moore, Joe G., Jr.	9-1-52	15	3	
Nairn, Marguerite	1-7-46	10	1½	
Pittman, H. C.	5-10-54			
Rice, Florence E.	4-7-54		5	

PERSONNEL	EMPLOYMENT	VACATION	SICK LEAVE	LEAVE OF ABSENCE
ROBEY, MINNIE	8-28-47	8½	3½	
ROSEBROUGH, ROBERT G.	4-1-54 - 9-15-54		1	
SCHMIDT, CORINE	2-12-52	10	11½	
SMALL, SYBIL	3-1-36	5	2½	
SMITH, IRENE	3-27-52 - 8-31-54	10	8½	
STEPHEN, JOE S.	6-8-54 - 8-54		1	
STEVENS, JUNE K.	9-2-52	10	10	
STEWART, JUANITA S.	10-21-52	10	11½	
SUMMERS, BETTY J.	2-9-54	5	2	
TAYLOR, ALBERT S.	9-21-53 - 2-7-54		1	
TAYLOR, MARY ELLEN	4-19-54		8½	
THURMOND, BETTY N.	12-1-53 - 3-31-54			
USSERY, ANGELA S.	4-1-54 - 4-6-54			
WALKER, ROBERT	7-14-53 - 11-18-53			
WATTERSON, WINIFRED	8-20-53	10	11	
WHITIS, WILLIE LEE	1-19-39	10	2	
WRIGHT, BENNIE F.	2-24-54 - 3-31-54			
YEARY, NONA LEE	1-12-49	10	14½	

CHAPTER XIII

SUMMARY

Although management strives to fully utilize the skills of labor, it often overlooks the benefits which the employee and the company derive from accident prevention. Typical plants at which this important fact has not been given full consideration are the Mabry Foundry and Machine Company and Iron Castings, Incorporated of Beaumont, Texas. Because of not making safety a part of general operations, accidents at these two plants have resulted in costs of approximately $50,000 between August 1, 1946 and July 31, 1953.

Mabry Foundry was founded in 1925. Through the years this grey iron foundry, which now employees about thirty-five persons, has made jobbing work a specialty. Its main interests are now toward the manufacture of municipal castings. Sales for 1953 are expected to reach $840,000. Iron Castings, Incorporated began production in March 1952. This is a grey and alloy iron jobbing foundry. It is hoped that, in the near future, alloy irons will become its specialty. There are twenty-five employees working in the plant valued at over $40,000. Although production now averages six tons per day, the capacity is much higher. Yearly sales amount to nearly $100,000.

During the seven years covered by this study, there were a total of one hundred and sixty-one cases, reported to the industrial compensation insurance carrier. These one hundred sixty-one accidents and those medical costs not reported to the carrier resulted in direct costs of $49,010. Where descriptions were complete, the accidents have been analyzed according to the American Standards Association, "American Recommended Practice for Compiling Industrial Accident Causes"[1]. Because of the high accident frequency and/or severity rates of the companies, the premium rates were based on an average of 37.5 per cent debit. The most common injury during the period being studied involved the eyes. Although the eyes were involved in 34.0 per cent of all cases, only 3.0 per cent of the total costs resulted. In contrast to the low cost - high frequency, eye accidents were those injuries effecting the body in "general". Accidents involving either the whole body or a large portion of it resulted in 2.8 per cent of the accidents, but 30.8 per cent of the costs. The most expensive accident cost $9,000.00 and was the result of a truck driver's death. Dusts were the most common accident agency with hot substances being second. There were twenty cases involving burns.

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[1] "American Recommended Practice for Compiling Industrial Accident Causes", National Safety Council, (New York: American Standards Association, 1941), 37 pages.

A large portion of the accidents at Mabry Foundry and Iron Castings, Incorporated have been a direct result of physical hazards. The majority of these hazards are believed to exist within five groups. The groups cover:

(A) Poor Housekeeping -- This term covers a wide range of factors which generally includes the visible condition of the plant. Poor housekeeping demonstrates untidiness, poor training, and most important of all, poor employee attitude. Each tool or piece of equipment should have a definite place and should be kept there. Waste paper, pieces of wire, and wooden blocks should be put in waste containers and not thrown on the molding floor. Poorly stacked flasks also add to hazardous and poor housekeeping conditions. Materials stacking in yard areas is a phase of housekeeping important to accident prevention and materials inventory control.

(B) Unsafe Mechanical and Manual Lifting Methods -- Eighty of the two hundred and nine accidents which are covered by this study involved materials handling. Many of these accidents occurred during manual handling operations; they might have been prevented had the workmen been instructed in proper

lifting and carrying techniques. Unsafe practices and insufficient mechanical handling devices also caused a number of injuries. Such equipment is not only lacking in quantity, but also in quality at Mabry Foundry. The equipment in existence at Iron Castings is of a high quality, but additional lifting devices would not only add to safe working conditions, but would also aid in a production increase.

(C) Dusts and Flying Particles -- Industrial dust and flying particles are a source of hazards that may affect the extremities as well as the internal parts of the body. Safety glasses will prevent a large majority of eye injuries caused by flying particles. Grinding, sand preparation, and shake out dusts are common in foundries. These may be controlled either by the installation of dust collectors, by providing personal protective equipment for the employees in the form of respirators, or by a change in the process used. An outstanding dust hazard which exists at both Mabry Foundry and Iron Castings is the result of shake out operations. This condition could easily be eliminated at Iron Castings through the installation of a dust collector;

Mabry Foundry's situation is somewhat different, however, since its shake out unit is portable. It is therefore recommended that all employees at Mabry Foundry be required to wear respirators while performing this operation since it is impractical to change the process by installing a permanent type shake out machine and dust collector

The result of these dusts can be silicosis. This disease is caused by the employee taking into his breathing system particles of silica less than 3/2500 of an inch in size. Yearly tests should be made in dust areas to make certain that the amount of free silica does not go above the threshold limit.

(D) Lack of Proper Illumination -- Good lighting is practical in industrial operations. Light sources used may be natural or artificial. A good source of light, for daytime operations may be emitted to a building by sunlight. The desirable window area is one-third that of the floor area. Mercury vapor lamps are recommended as an artificial light source. The foundries concerned in this problem have far below standard lighting. The light

intensity is often 50 per cent and even more, in some cases, below standard. The use of a recognized color scheme often aids in increasing the amount of light at a working level.

(E) Electrical Hazards -- Electrical equipment is common in foundry operations and may present an extreme hazard if not properly controlled. Poor maintenance is often a cause of electrical hazards. All electrical equipment should be properly located and marked.

Safety has a definite place in an industrial organization. Because the companies concerned here are small, it is recommended that the line and functional-staff type of organization be used and that the safety section shall be under the companies engineer. The responsibility for safety is everyone's concern, and may be explained more easily by stating that it is the responsibility of four groups: (1) top management, (2) the safety director, (3) the foremen, and (4) the individual employees. Each of these groups are necessary to a properly functioning safety section. The safety section, under the supervision of the safety director, shall have jurisdiction over, (1) safety meetings and training programs, (2) the recommending of protective equipment, (3) periodic plant inspections, and (4) the maintaining of accident records

and methods used in accident prevention.

Protective equipment in the form of mechanical equipment and personal equipment is in use at Mabry Foundry and Iron Castings. The outstanding piece of mechanical equipment at both foundries is the cupola charging device. Iron Castings has another outstanding piece of safety equipment in its completely enclosed sand mulling machine. In order that there be a clear understanding as to the personal protective equipment to be used in performing different foundry operations, a complete list should be determined and made known to all employees. Safety glasses and safety shoes are required at all times; while equipment such as cup type goggles, leggings, hard hats, gloves, and respirators will depend upon the job being undertaken.

So as to make possible the complete analyzation of future accidents, it is necessary that all accidents be properly reported and recorded. Those cases involving direct costs of less than $15.00 and where there is no employee lost time shall be paid by the company directly to those rendering services. Any accident involving lost time must be reported to the Texas Industrial Accident Board and is to be paid by the industrial compensation insurance carrier. "No-lost time" injuries are to be reported to the safety director by the injured man's supervisor. He will make a

report in duplicate, using the "Foreman's Report of No-lost-time Injury" form. Lost time injuries will be reported by using the "Standard First Report of Injury" form. Four copies and the original are to be given to the safety director. A company record of all injuries is to be kept, (1) in the office of the safety director, (2) in the employee's personal company file, and (3) on the employee's "Office Information and Safety Card" located at the individual plants.

A great many accidents occurring at the two foundries were a result of either poor employee attitude or because the workman was not properly trained in operating procedures. To overcome these problems, a safety education program is recommended. The safety education program will be conducted in the form of small groups performing similar operations and through general plant meetings. Such topics as "Responsibility for Safety", "Safety Rules and Regulations", "Eye Protection", and "Safe Grinding Procedures" will be discussed.

A safety committee is a profitable method of giving all employees an opportunity to share in the accident prevention program and to aid the safety director, in carrying out the program. This committee is to be composed of six members, the safety director, shop foreman and four shop employees. It will serve in an advisory capacity by aiding in plant inspections, employee training and the enforcement of safety rules.

Although in some instances safety rules are a disadvantage, they are generally accepted as necessary by management, labor organizations, and the working man. These rules should be formulated and approved by the safety committee and thoroughly explained to all employees. They should be explained to all new employees. A copy of the rules should be retained on the bulletin board at all times.

B I B L I O G R A P H Y

BIBLIOGRAPHY

A. Books

Blake, R. P., Industrial Safety, New York: Prentice-Hall, Inc., March 1949.

Dickie, A. L., Production With Safety, New York: McGraw-Hill Book Company, Inc., 1947.

Heinrich, H. W., Industrial Accident Prevention, New York: McGraw-Hill Book Company, Inc., 1950.

Judson, H. H. and J. M. Brown, Occupational Accident Prevention, New York: John Wiley and Sons, Inc., 1944.

Lippert, F. G., Accident Prevention Administration, New York: McGraw-Hill Book Company, Inc., 1947.

Weiss, J. E., 1021 Answers to Industrial Health and Safety Problems, Cleveland: Occupational Hazards, Inc., 1943.

B. Periodical Articles

"Accidents in Foundry Operations as Analyzed by Cause", Industrial Bulletin, 23: 138-40, April 1944.

Bennett, F. G., "No Plant Too Small (for a safety organization)", Safety Engineering, 89:16-18, April 1943.

Brooking, W. J., "Safety in Industrial Safety", National Safety News, 53:22-3, June 1948.

Dooley, C. R., "Supervisors and Safety", Personnel Administration, pp. 4-7, November 1947.

Fain, R. A., "Safe Operation of Portable Grinders", Foundry, 76:86-9, September 1948.

"Foundry Dust", Safety Engineering, 82:41-2, December 1941, 83:40, January 1942, 83:40, February 1942.

Jones, W. C., "Basic Needs for the Analysis of Industrial Injuries", Monthly Labor Review, R70:267-70, March 1950.

McKay, "Inspection, Detection Correction", Safety Engineering, 90:38-42, August 1944.

Mould, D., "Getting Worker Cooperation in Industry", Safety Engineering, 93:18-9, May 1947.

Nelson, G. W., "Hazardous Practices in Foundries", Safety Engineering, 27:434-43, June 1914.

Pollock, H. L., "Look to Your Foundry", Safety Engineering, 91:32-3, January 1945.

Sappingtom, O. C., "Silicosis - Industrial Enemy", Factory Management, 93:291, July 1935.

Schendel, T. A., "Safety in Foundry Operations", Foundry, 60:43-4, September 1932.

Schnieder, W., "Adopting a Safety Program to the Small Industrial Plant", Journal of American Insurance, pp. 29-32, May 1947.

Shaw, J. S., "Safety Then and Now - 1902-1946", National Safety News, pages 90-1, October 1946.

Wood, W. W., "Can Safety Attitudes be Changed", Glass Industry, 30:265-7, May 1949.

C. Publications of Learned Organizations

Accident Facts, Chicago: National Safety Council, 1930-52.

Accident Prevention Manual for Industrial Operations, Chicago: National Safety Council, 1951.

American Recommended Practice for Compiling Industrial Accident Causes, National Safety Council, New York: American Standards Association, August 1941.

American Standard Practice for Industrial Lighting, Illuminating Engineering Society, New York: American Standards Association, August 22, 1952.

Methods of Compiling Industrial Injury Rates, National Safety Council, New York: American Standards Association, October 11, 1945.

Recommended Good Safety Practices For the Protection of Workers In Foundries, Chicago: American Foundryman's Association, 1945.

Safe Practices Pamphlets, Number 14, "Goggles", 1940, Number 53, "Checking Plans and Specifications for Safety", 1938, Number 73, "Foundries", 1941, Number 75, "Safety Inspection", 1941, Chicago: National Safety Council.

APPENDIX I

DESCRIPTION OF ACCIDENTS OCCURRING AT

MABRY FOUNDRY AND MACHINE COMPANY

BETWEEN AUGUST 1, 1946 AND JULY 31, 1953

BETWEEN AUGUST 1, 1946 AND JULY 31, 1947

Date	Name	Description	Cost
8-7-46	N. Church	Operating lathe when steady rest fell on left foot. Middle left toe was amputated.	147.80
8-13-46	L. H. Baker	Crushed small finger of right hand while operating crane.	6.00
8-13-46	R. E. Kirkland	Carrying sack of bentonite clay. Stumbled and fell on short object on ground. Deep gash on right knee resulted	9.00
9-12-46	W. E. Phillips	Mold slipped out of hand and fell on big toe of right foot resulting in fracture of foot.	2.73
9-26-46	A. Devine	Foreign body flew under safety goggles into right eye.	3.00
9-28-46	L. Mitchell	Working on crane. Shield fell, fracturing first phalanx of right middle finger.	1,202.86
10-9-46	V. Edwards	Foreign body flew into right eye.	4.00
10-31-46	W. E. Phillip	Lifting mold, developed soreness in muscles of back.	495.75
11-1-46	Vance Edwards	Mold broke while employee was trying to cover overflow with sand. Iron splashed on feet and hands.	1,025.42
11-29-49	J. W. Fountain	Wrenched back while picking up core.	36.57
12-9-46	C. Roy	Dodged one object and ran into another, causing slight bruise in chest.	63.64
12-11-46	Joe Stewart	Lifting up on wheel barrow, developed pain below right costal border. Condition due to gall bladder infection, not to injury.	3.00

Date	Name	Description	Cost
1-2-47	Simon Lee	Pushing wheel barrow. Slipped and fell on it. Possible contusion over upper left side of chest.	18.00
1-28-47	Remil Pipkin	Backed into centrifugal casting machine while it was running and lugs caught his pants pulling him into machine. Result was first degree abrasion of right thigh and knee.	3,742.75
1-30-47	R. R. Reed	Dropped valve pattern on finger while setting it down. Injury of right middle finger.	12.50
3-11-47	Ed Kirkland	Dropped tool in hot tar. Stuck hand into tar to get tool. Burns on hand and fingers resulted.	29.00
3-12-47	J. D. Williams	Loading wheel barrow with iron and caught hand between it and piece of iron. Left little finger bruised.	8.00
3-18-47	R. L. Lewing	Finger caught in braces of mold. Lost nail of index finger of left hand.	9.00
3-24-47	J. W. Fountain	Taking core off truck when sharp pains hit back. Possible rupture of intevertibral disc.	5,134.25
3-27-47	Henry Martin	Foreign body flew in right eye.	3.00
4-7-47	James Carter	Pouring molten iron. Some metal got into shoe. Second degree burns to right foot resulted.	25.37
4-10-47	Mamon Rucker	Shaking out casting, piece of iron flew into eye. Second degree burns of inner portions of right eye.	17.00
4-15-47	D. R. Ingham	Foreign body in left eye.	3.00
5-12-47	Arthur Devine	Emery wheel came loose and hit right arm.	10.50
5-13-47	G. Taylor	Infection of third finger of right hand.	5.00

Date	Name	Description	Cost
5-15-47	M. Thibodeaux	Picking up hot mold. It slipped, burning left forearm.	5.00
5-22-47	J. C. Lane	Shaking out flask. Dropped it on toe, injuring left big toe.	10.00
6-3-47	Jack Hawkins	Moving a portable sand mixer. The damp sand acted as a ground through his body causing a shock.	14.00
6-3-47	J. F. Hoyt	Moving a portable sand mixer. The damp sand acted as a ground through his body causing a shock.	4.00
6-3-47	L. Z. Wingfield	Moving a portable sand mixer. The damp sand acted as a ground through his body causing a shock.	4.00
6-9-47	Herman Conley	Grinding wheel broke and piece hit employee's leg. Laceration of right leg.	56.70
6-12-47	R. S. Wells	Drilling cast iron. Foreign body flew into right eye.	7.00
6-14-47	Enous Minnix	Caught thumb of left hand between two flasks bruising left thumb.	8.00
6-18-47	Henry Martin	Knocking core out of casting. Scratched left eyeball.	108.50
7-2-47	Author Thomas	Passing through grinding area. Foreign body entered right eye.	3.00
7-3-47	Charlie Tallery	Picking up piece of iron; it slipped from hands and dropped on toe. Caused blood clot.	72.79
7-8-47	Jack Hawkins	Cut right thumb with saw while cutting wood.	8.00
7-17-47	Joseph Andrus	Dust entered right eye while passing through clean-up room.	3.00

Date	Name	Description	Cost
7-28-47	Joseph Andrus	Lifting flask and strained back.	59.28
7-30-47	J. D. Williams	Strained back picking up iron.	17.50
7-31-47	William Conner	Pouring hot metal. Some of the iron spilled on left foot.	90.83

Number of cases from August 1, 1946 to July 31, 1947 41 Total Cost 12,488.24

BETWEEN AUGUST 1, 1947 AND JULY 31, 1948

Date	Name	Description	Cost
8-1-47	B. Barry	Pouring molten iron from cupola and metal splashed, burning right hand.	3.00
8-4-47	A. M. Ludolph	Blowing metal chips in lathe and dust or metal chip flew into eye.	17.35
8-6-47	J. D. Williams	Loading wheelbarrow with iron and caught hand between it and piece of iron. Left little finger bruised.	8.00
8-14-47	E. Hay	Using electric lift to place pipe in drill press. The lift giving way, letting pipe loose on leg. Bruised leg above knee.	480.23
8-21-47	Preston Thibodeaux	Dust from grinding wheel flew into eye while passing through clean-up room.	3.00
8-26-47	S. Angrus	Pouring metal. Spilt some on right foot.	40.20
9-3-47	Charlie Tallery	Lifting large casting; slipped, dropping it on foot. Right foot bruised.	14.50
9-24-47	J. D. Williams	Hammer came off handle, hitting him on top of foot, slightly cracking bone.	80.90
10-10-47	O. Sweezy	Cutting with lathe. Dust particle flew into eye.	7.00
10-21-47	P. Castille	Grinding piece of iron. Particle flew into right eye.	7.00
11-13-47	S. Lee	Loading scrap for copula. Iron dust flew into left eye.	7.00
11-26-47	H. Jefferson, Jr.	Lifting mold with hoist, chains on mold. Caught finger in chains.	10.50
12-2-47	H. Da Costa	Piece of iron dropped off board, hitting employee on right foot.	5.00

12-5-47	J. T. Mattox	Passing through clean-up room. Foreign body in left eye.	7.00
12-10-47	Ed Kirkland	Lifting piece of cast iron, cut little finger	4.00
12-17-47	E. F. Moore	Lifted sand core while molding and let it slip, dropping on right foot.	13.50
12-31-47	Albert Frank	Grinding cast iron, dust flew into right eye.	13.00
1-2-48	S. Marks	Grinding cast iron, dust flew into right eye.	7.00
1-7-48	S. A. Bonnett	Overhead crane hook, used for turning molds over, slipped, hitting man on top of head.	5.00
1-7-48	E. C. Moore	Raising flask, it slipped from crane, mashing man's right foot.	14.50
1-17-48	Ed Kirkland	Passing by grinding machine, dust flew into right eye.	3.00
1-19-48	R. R. Reed	Pouring molten metal, some flew into right eye, burning eye lid.	35.00
1-30-48	T. Rucker	Unloading iron from sand pile. Iron slipped, hitting right leg.	23.75
2-3-48	R. Scott	Dust flew into eye while grinding metal.	3.00
2-3-48	R. Scott	Grinding, something flew into right eye.	5.00
2-9-48	Ed Bowman	Pouring hot metal. Caught clothes. Second degree burns of left foot and leg.	11.00
2-10-48	D. Ingham	Lifting piece of iron. Strained back.	27.50
2-16-48	Ed Manuel	Pouring iron. Metal burned right hand.	6.00
2-17-48	W. Caster	Pouring off hot metal, burned right foot.	3.00

2-27-48	C. Jones	Loading metal in wheelbarrow. Metal struck him in head.	18.00
3-1-48	M. Thibodeaux	Cleaning up around cupola when trash flew into right eye.	5.00
3-2-48	N. G. Newsome	Got dust in eye while grinding.	259.77
3-3-48	Ed Bowman	Fell off edge of building hurting side. Fractured rib.	50.94
3-13-48	S. Marks	Lifting casting, strained left side.	13.00
3-26-48	L. H. Moge	Welding on iron. Slipped and knocked piece of iron on foot.	79.64
3-26-48	J. Stewart, Jr.	Electric crane switch hanging on cable was swinging and hit him in the face.	5.00
3-31-48	O. Lazard	Lifting drop hammer with crane. Catch on hammer slipped and hit him on top of the head.	21.00
4-2-48	E. Cook	Nailing and hit thumb with hammer causing swelling.	19.25
4-5-48	R. Babilo	Going through clean up room. Dust flew into eye.	3.00
4-8-48	E. Kirkland	Carrying cylinder of oxygen and dropped it on right foot, breaking bone.	41.00
4-24-48	S. Francais	Placing manhole cover into ring. Cover slipped, cutting off large right finger at first joint.	373.40
4-28-48	E. Hall	Hit left finger with hammer.	8.00
4-29-48	S. Lee	Breaking iron with maul. Iron slipped and hit right leg.	10.00
4-29-48	J. M. Robinson	Metal splashed while being poured, burning right foot and ankle.	9.50
5-7-48	S. Smith	Carrying loaded ladel of iron, it hit back causing bruise.	151.00

Date	Name	Description	Cost
6-1-48	J. W. Sheffield	Making cores out of sand. Particle flew in left eye.	12.25
6-8-48	C. A. Beavers	Lifting casting, slipped, hitting right fore finger.	42.75
6-8-48	J. Gullory	Carrying board across foundry. Hit his right foot on piece of metal. Cut foot.	69.50
6-8-48	S. Marks	Chipping iron with chisel; piece flew in right eye. Broke glasses	10.00
6-9-48	Ed Manuel	Belts slipping, he placed some belt dressing on belts, letting thumb get caught in belts and pulley. Cut thumb.	39.29
6-14-48	J. Hawkins	Lifting mold with helper. Helper let mold get out of control. Strained back.	95.00
3-31-48	O. Lazard	Breaking iron with hammer of electric crane. Piece flew up, hitting and cutting right thumb.	156.94
6-15-48	B. Alloson	Burned left foot.	3.50
6-23-48	M. Johnson	Grinding cast iron. Foreign body entered right eye.	16.40
6-24-48	W. L. Walker	Dropped hammer breaking iron. Piece flew into air hitting right leg. Leg was bruised.	10.50
7-2-48	M. Johnson	Working on grinder and got something in left eye.	4.25
7-2-48	R. R. Reed	Caught and mashed right ring finger while pouring metal.	8.00
7-16-48	I. W. Whitworth	Adjusting machine when his wrench slipped and got scratched on his right hand.	28.50
7-20-48	W. D. Matlock	Dropped manhole on right middle finger. Fracture of middle finger.	8.00

Date	Name	Description	Cost
7-23-48	H. Martin	Passing emery wheel and got dust in left eye.	3.00
7-28-48	R. J. Stalcup	Passing grinder and got foreign body in eye.	3.00

Total Number of Cases from August 1, 1947 to July 31, 1948 61 Total Cost 2,443.31

BETWEEN AUGUST 1, 1948 AND JULY 31, 1949

Date	Name	Description	Cost
8-4-48	D. Robinson	Breaking iron, got foreign body in left eye.	3.00
1-4-49	C. G. Ware	Trying to put belt on moving pulley, caught right hand under same. Cut hand and fingers.	1,131.00
3-29-49	L. W. Whitworth	Grinding knives. Emery dust entered right eye.	10.50
5-11-49	E. Rubin, Jr.	Clamping flask with a clamp. Clamp caught his finger and bruised it. Fracture.	73.11
7-13-49	W. A. Scanbnough	Driving truck and missed bridge. Driver killed.	9,000.00

Total number of Cases from August 1, 1948 to July 31, 1949 5 Total Cost 10,217.61

DESCRIPTION OF ACCIDENTS OCCURRING
BETWEEN AUGUST 1, 1949 AND JULY 31, 1950

Date	Name	Description	Cost
8-30-49	A. C. Williams	Placing weight on top of mold. Mold broke and hot metal ran into shoe.	308.97
10-8-49	Ed Bowman	Cleaning out ladel and got right middle finger cut off at first joint.	372.00
11-10-49	J. Jackson	Picking up mold with crane. Caught finger in sling, cut off little finger.	204.60
1-12-50	W. T. Harper	Unloading truck. Casting slipped, catching right middle finger.	16.00
4-10-50	Ed Kirkland	Foreign body blew into right eye while employee was on truck.	5.00
4-28-50	W. Frank	Grinding and got foreign body in right eye.	5.00
5-6-50	N. Church	Turning on wood lathe. A splinter went through his finger. Laceration of finger.	19.00
7-17-50	S. Marks	Foreign body entered right eye while grinding.	5.00
7-19-50	R. Scott	Using air grinder, got particle in right eye.	5.00

Total Number of Cases from August 1, 1949 to July 31, 1950 9 Total Cost 940.57

BETWEEN AUGUST 1, 1950 AND JULY 31, 1951

Date	Name	Description	Cost
8-3-50	C. Johnson	Strained muscles in right lower abdomen when handling molds.	20.25
8-8-50	A. Daigle	Unloading iron and dropped iron on finger of right hand. Contused end of third finger.	5.00
8-25-50	A. Moore, Jr.	Was working on molding machine and a piece of steel flew up and hit right eye.	80.69
9-15-50	E. Manuel	Pouring metal and got trash in right eye.	14.40
9-15-50	J. C. Tucker	Finger of right hand mashed.	8.00
9-22-50	M. Johnson	Making concrete forms and got something in right eye.	6.25
9-27-50	R. R. Reid	While pouring iron, got something in right eye.	5.00
9-28-50	R. Scott	Using air grinder, got particle in right eye.	5.00
10-10-50	T. Gabriel	Pushing over a barrel of iron by himself when he felt sudden pain in left groin.	200.97
10-13-50	E. P. Coleman	Strained back unloading casting off truck.	198.75
12-15-50	C. Andrus	Cleaning out mold and was hit by wrecking bar that fell off traveling crane. Laceration of scalp.	51.00
12-15-50	W. Williams	Cleaning out mold and was hit by wrecking bar that fell off of traveling crane. Laceration of lower eyelid.	200.15
1-19-51	L. Mooneyhan	Lifting a core box when he strained his back, pain in middle of back.	2,299.95
2-16-51	A. Harris	Pouring hot metal into mold, splattered into right eye.	28.25

Date	Name	Description	Cost
2-28-51	L. Alsandor	Was loading cast iron grates on a truck. Grates slipped out of hand falling on finger. Cut finger off at first joint.	628.76
3-6-51	P. Bonnett	Was handling a heavy core box, felt a little hurt on right side of body. Strain.	357.99
4-11-41	S. Lee	Bucket ran up and down an iron rail by electricity. He wanted to stop the bucket as it came down. Bucket ran on his hand. Mashed fingers and cut off thumb.	1,106.66
4-30-51	J. Oliver	Drilling piece of iron and iron hung in drill, and slung it around and hit hand. Cut thumb.	44.00
5-22-51	C. Castille	Was holding a piece of iron in his hand. Piece of iron dropped on his hand and foot.	35.00
6-7-51	E. Hebert	Raising river clamp pattern with crane. Came loose and hit employee on hand. Sprained wrist and left hand.	74.43

Total Number of Cases From August 1, 1950 to July 31, 1951 20 Total Cost 5,370.50

DESCRIPTION OF ACCIDENTS OCCURRING
BETWEEN AUGUST 1, 1951 AND JULY 31, 1952

Date	Name	Description	Cost
8-27-51	J. D. Connell	Core oven exploded and burned face, hands, arm, eyes. First and second degree burns.	51.50
8-28-51	Robert Jones	Wrench fell striking him on head and right shoulder.	1,212.05
11-5-51	Glafer Blackmon	Three men dropped river clamp on his foot.	47.90
11-5-51	Durrell Derbigney	Putting sand with a shovel in milling machine; caught hand in blade.	787.60
11-27-51	Robert Johnson	Was pouring hot iron in mold, mold exploded and hot iron flew into eyes.	115.65
12-8-51	Scott Jones	Claimed he was raising a heavy weight, strained back.	54.00
12-12-51	Clarito Rodriquez	Turing over mold and got finger caught under mold.	49.43
12-15-51	Coleman Fruge	Walking, claims slipped and fell, straining middle part of back.	12.00
12-21-51	Willis Sellers	Raising on weight and claims strained back.	10.00
1-1-52	Samuel Powell	Working behind a winch truck raising heavy river clamp, hit foot.	1,218.85
2-26-52	Jack Frank	Working behind winch truck lifting weight and fell on foot.	202.00
2-28-52	Cleveland Andrus	Was putting sand in machine, caught hand.	195.60
2-29-52	Charlie Broussard, Jr.	Unloading carload of pipe, strained back.	3.00
4-15-52	Buell Owens	Pouring hot iron in mold-busted went into shoe.	258.57

Date	Name	Description	Cost
6-4-52	A. L. Randall	Unloading drum off truck; slipped and fell.	36.00

Total Number of Cases from August 1, 1951 to July 31, 1952 15 Total Cost 4,254.15

DESCRIPTION OF ACCIDENTS OCCURRING
BETWEEN AUGUST 1, 1952 AND JULY 31, 1953

Date	Name	Description	Cost
8-7-52	Ralph Griffin	Splint, O. C.	9.00
8-13-52	H. H. Marks	Silicosis	5,263.60
8-26-52	Omel Lazard	Pouring hot iron in mold, bar slipped and hit him on hip.	197.11
9-2-52	Tom Benjamin	O. C.	5.00
9-4-52	Dwight Smith	Foreign body in eye.	13.00
9-16-52	John Pugh	X-Ray and dressing	21.00
9-22-52	Ed Stewart	X-Ray	13.00
9-23-52	Willie Lindsey	Starting sand cutter. Foot was under wheel. Smashed foot.	57.89
9-29-52	M. Thibodeaux	Foreign body in eye.	5.00
10-7-52	Leroy Antwine	Foreign body in eye.	5.00
10-7-52	John Pugh	Foreign body in eye.	13.00
11-24-52	Buel Owens	Foreign body in eye.	8.00
1-8-53	Charlie Broussard	Foreign body in eye.	13.00
1-9-53	R. R. Reid	X-Ray and office call	15.00
2-24-53	C. M. Kennedy	Foreign body.	8.00
3-18-53	Tom Benjamin	Sutures removed; hit on head	16.00

Date	Name	Description	Cost
4-2-53	Charlie Broussard	Foreign body	5.00
4-28-53	Matthew Johnson	Foreign body in eye	27.25
5-7-53	Henry Martin	Foreign body	5.00
6-4-53	Jack Frank	First aid finger dressing	10.00
6-16-53	Shelby Bonnett	X-ray big toe	10.00
7-6-53	Leroy Antwine	Foreign body	5.00
7-15-53	Matthew Johnson	Foreign body	14.00
7-28-53	Joe Steward, Jr.	Working on shake out machine, piece of scrap iron flew up and hit eye.	46.50

Total Number of Cases from August 1, 1952 to July 31, 1953 24 Total Cost 5,785.35

DESCRIPTION OF ACCIDENTS OCCURRING AT

IRON CASTINGS INCORPORATED

BETWEEN MARCH 1, 1952 AND JULY 31, 1953

DESCRIPTION OF ACCIDENTS OCCURRING
BETWEEN MARCH 1, 1952 AND JULY 31, 1953

Date	Name	Description	Cost
7-22-52	J. O. Connell	Foreign body in eye while grinding	17.00
8-11-52	J. O. Connell	Foreign body	15.00
8-28-52	Williford Woods	X-ray shoulder	10.00
9-11-52	J. L. Stanley	Foreign body	13.00
9-13-52	C. O. Martin	Foreign body	22 00
9-19-52	Williford Woods	Laceration of finger	25.00
9-25-52	L. C. Brydson	Strained back	23.00
10-15-52	Leroy Renfro	Foreign body	18.00
10-16-52	Johnny Martin	Foreign body	24.00
10-16-52	Johnny Martin	Foreign body	19.00
11-1-52	Leroy Renfro	Foreign body	10.00
12-22-52	Isaac Spikes	Operating sand conveyor; caught hand	3,918.00
1-5-53	Johnny Martin	Moving castings and one fell back on leg	63.00
2-11-53	Leroy Renfro	O. C.	3.00
2-24-53	Joseph Valmore	Hot iron went into shoe, burning foot.	402.20
2-25-53	L. C. Brydson	Foreign body	5.00
3-9-53	R. J. Lewing	Foreign body	5.00

Date	Name	Description	
3-25-53	Leroy Renfro	Foreign body	5.00
4-7-53	James O'Neal	Foreign body	5.00
4-17-53	S. Banda	Flask fell on foot.	240.00
5-22-53	Eric Hall	X-ray legs and foot	37.00
6-16-53	R. C. Mettlen	Foreign body	5.00
7-26-53	Johnny Martin	Muscular strain	24.00
7-31-53	L. C. Bryson	Puncture wound	17.00
7-31-53	Joe Page	Muscular strain	20.00

Total Number of Cases from March 1, 1952 to July 31, 195 25 Total Cost 4,945.20

APPENDIX II

TEIA 7049-A

STANDARD FORM FOR

EMPLOYER'S FIRST REPORT OF INJURY

Approved by I. A. I. A. B. C.

Send to INDUSTRIAL ACCIDENT BOARD, AUSTIN, TEXAS
Penalty of $1,000 fine for failure to file within 8 days after injury. Sec. 7, Article 8307, Employers' Liability Law.

Send two copies to: TEXAS EMPLOYERS' INSURANCE ASS'N

State's Number For:	File..... Carrier:..... Employer:.....
Carrier's File No.	

(The spaces above not to be filled in by Employer)

Employer

1. **Name of Employer** .....
2. Office address. No. and St ..... City or Town ..... State.....
3. **Insured by**..... TEXAS EMPLOYERS' INSURANCE ASSOCIATION
4. Give nature of business (or article manufactured).....

Time and Place

5. (a) Location of plant or place where accident occurred, City ..... County.....
   State of ..... Department..... State if on employer's premises .....
   (b) If injured in a mine, did accident occur on surface, underground, shaft, drift or mill?.....
6. **Date of Injury**..... 19.. Day of Week ..... Hour of Day..... A.M..... P.M.
7. Date disability began..... 19..... A.M..... P.M. 8 Was injured paid in full for this day? .....
9. When did you or foreman first know of injury? .....
10. Name of foreman .....

Injured Person

11. **Name of Injured**..... Social Security No.....
    (First Name) (Middle Initial) (Last Name)
12. Address: No. and St ..... City or Town..... State.....
13. Check (√) Married..... , Single .... , Widowed.... , Widower.... , Divorced , Male , Female .; White. , Colored... .
14. Nationality..... Speak English .....
15. Age ..... Did you have on file employment certificate or permit? .....
16. (a) Occupation when injured ..... (b) Was this his or her regular occupation?.....
    (If not, state in what department or branch of work regularly employed).....
17. (a) How long employed by you ..... (b) Piece or time worker ..... (c) Wages per hour $.....
18. (a) No. hours per day..... (b) Wages per day $.....
    (c) No. days worked per week ..... (d) Average weekly earnings $.....
    (e) If board, lodging, fuel or other advantages were furnished in addition to wages, give estimated value per day, week or month .....

Cause of Injury

19. Machine, tool or thing causing injury..... 20 Kind of power (hand, foot, electrical, steam, etc) ..... 21 Part of machine on which accident occurred .....
22. (a) Was safety appliance or regulation provided?..... (b) Was it in use at time? .....
23 Was accident caused by injured's failure to use or observe safety appliance or regulation?.....
24. **Describe fully how accident occurred, and state what employee was doing when injured** .....
25. Names and addresses of witnesses.....

Nature of Injury

26. Nature and location of injury (describe fully exact location of amputations or fractures, right or left).....
27. Probable length of disability..... 28. **Has injured returned to work?**.....
    If so, date and hour ..... At what wage $.....
29. At what occupation?.....
30. (a) Name and address of physician.....
    (b) Name and address of hospital.....

Fatal Cases

31. **Has injured died?**..... If so, give date of death.....

Date of this report..... Firm Name.....

Signed by..... Official Title.....

APPENDIX III

TEXAS WORKMEN'S COMPENSATION LAW

The first State Workmen's Compensation Law was enacted in the United States about 1910. Texas passed such law in 1913 and all states have now enacted a similar law.

The purpose of the Workmen's Compensation Law is to provide protection for you while on the job. This protection is provided for you at the expense of your employer and without any costs whatsoever to you.

The principal benefits of the law consist of hospitalization and medical care and weekly compensation benefits while you are off of the job due to injuries sustained while you were on the job. The compensation benefits are payable weekly, but may be paid in a lump sum in death or total permanent disability cases. If the benefits are paid in a lump sum they are subject to a 4% compound interest discount. The law provides that the individual employee's benefit shall consist of 60% of the average weekly wage with a minimum of $9.00 per week and a maximum of $25.00 per week. It also provides that you will not start earning compensation until the beginning of the 8th day after the injury. For example, if an employee is injured on Tuesday afternoon and is paid for that day's work, compensation would start on a week from the next morning. There are two exceptions to this case. First, where the employee is off from work due to

injury for four weeks or more, he is then also paid for the first week of disability. The second exception applies to an employee who receives a specific injury such as the loss of a finger. In this case there is a certain amount due the employee regardless of the fact that he may not lose any time from work.

If you are killed on the job your beneficiary will receive 60% of your average weekly wage not to exceed $25.00 per week and a minimum of $9.00 per week for a total of 360 weeks. The total maximum amount paid weekly is $9,000.00. If your beneficiaries wish to receive payment in a lump sum and the Industrial Accident Board approves, this maximum amount would then be discounted and they would receive only $7,878.62. If you are totally and permanently disabled you will receive 60% of your average weekly earnings not to exceed $25.00 per week and a minimum of $9.00 per week for 401 weeks. The law also schedules a number of specific injuries, such as loss of certain of the various members of the body, and in the case of each such loss you receive a given number of weeks of compensation at 60% of your average weekly wage, subject to the maximum of $25.00 and the minimum of $9.00. In addition to the above you are entitled to hospitalization and doctor's care. You are entitled to a maximum of 91 days of doctor's care and a maximum of 180 days of hospital care.

Many times the question arises in an employee's mind regarding the advisability of obtaining an attorney when they receive an injury while on the job. It is not necessary for you to employ an attorney in order to receive the benefits to which you are entitled under the Workmen's Compensation Law. If you do employ an attorney he is entitled by law to 15% of the first $1,000 you receive and 10% and all above $1,000 if your claim is adjusted without going to court. If he takes the case to court he then may receive 1/3 of the total amount awarded to you and you will only receive 2/3 of the total amount. The Governor of the state appoints a three-member Industrial Accident Board who reviews all accidents of any consequence to make sure the employee receives the benefits to which he is entitled according to the Workmen's Compensation Law.

Who pays for this insurance? The entire premium is paid for by your employer. Employees are not subject to assessment by their employer for this insurance. Your employer pays for this insurance on a rate based on the amount of earnings you have from that company. The medical and hospital benefits are the same for all employees regardless of the amount of their salaries. The amount of compensation drawn is, however, based on 60% of the average weekly wage with the maximum of $25.00 per week and a minimum of $9.00 per week. The insurance company pays your doctor and hospital

bills and pays you your weekly compensation, but the rate that your company pays the insurance company is affected directly by the amount the insurance company pays out on your company's employees. This simply boils down to the fact that your company pays the bill plus enough to cover the expense of the insurance company. The cost of these benefits for you sometimes makes it difficult for your employer to meet competition if the number and cost of the accidents become excessive compared to other companies.

If at any time you have any questions regarding the rights or benefits under the Workmen's Compensation Law, please feel free to go to your employer and get his advice.

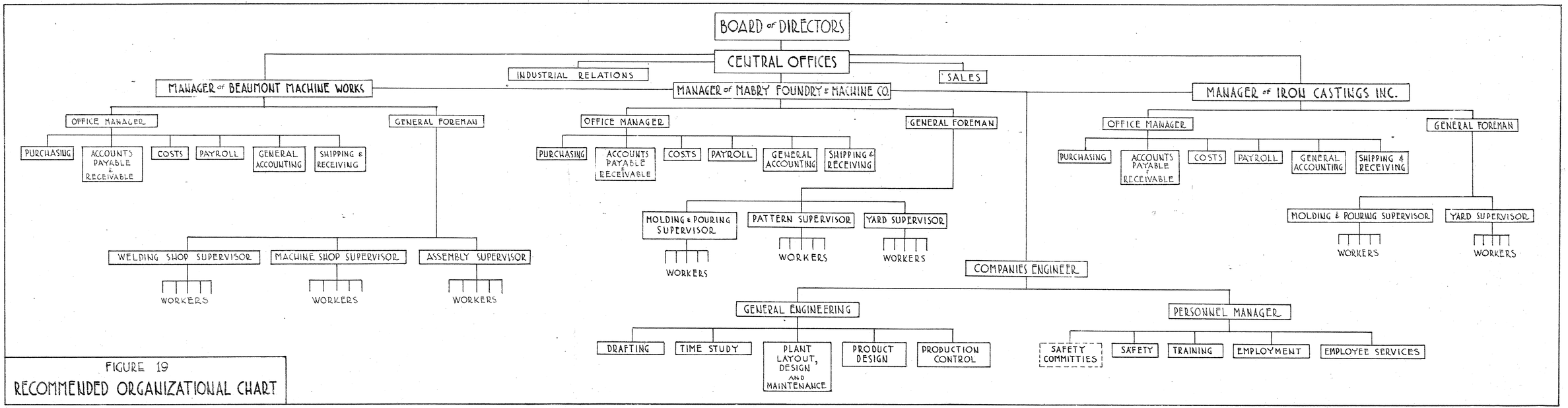

FIGURE 19
RECOMMENDED ORGANIZATIONAL CHART