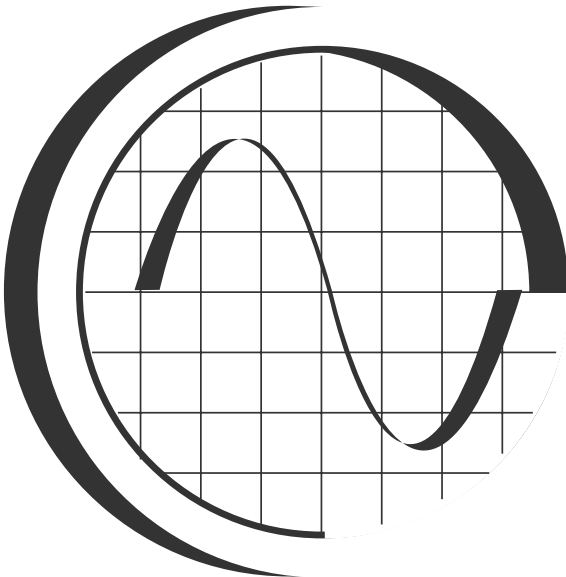


Safety and Health

Electrical Equipment Series 719



719 – Safety and Health

Lesson Plan for Chapter One Introduction to Safety

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719 – Safety and Health

Lesson Plan for Chapter One Introduction to Safety and Health

Objectives: Upon the completion of this Chapter, the student should be able to:

- Define the terms *accident* and *hazard*.
- Name and Define the four main types of hazards.
- List and define various types of accidents.
- Compare meanings of the terms *unsafe act* and *unsafe condition*.
- Name the three ways in which a toxic substance can enter your body.
- List ways in which a company must plan for emergencies.
- Tell the main reason for prompt accident investigation.

Responsibility for Safety

Your employer is responsible—by law—for providing you with a safe place to work.

Your employer must

- select safe equipment
- identify and control hazards
- establish safety rules and procedures

Not all the responsibility for your safety rests with your employer. You must arrive at work in good physical condition, do your job as you were trained to do it, and follow the safety rules and procedures.

COMMENTS

Following rules and procedures—especially rules made up by other people—can be irritating. (We almost always feel that we could have made up better rules ourselves.) Even if they are not perfect, it is a convenience to every one to have established rules and procedures so that it is not necessary for each employee to analyze the job, investigate the plant, and identify the dangers.

Some ordinary words have very specific definitions when they are used in safety regulations. You will find it easier to understand and remember the regulations if you make a point of remembering these specialized definitions.

An **accident** is an unexpected *event* resulting in injury, illness, or property damage.

A **hazard** is a *condition* that could cause an injury.

A high-pressure steam line is a hazard, but it cannot be eliminated from the plant. A shaky ladder is a hazard that can be eliminated.

Accidents are often caused by conditions that no one has yet recognized as hazardous. Part of your responsibility for safety is to report any conditions that may cause accidents.

1.04

Safety experts agree that a hazardous condition usually causes many close calls before it causes a major accident. One person may slip on an oily floor, hit his head on the cement and have permanent vision problems, while the next person slips in the same place and only gets his pants dirty.

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***Your Company's
Safety Program***

The safety program includes **training**, **methods of communicating** problems and changes of policy to all employees, and the **committees** or management structure that create the company's safety policies.

Safety Committees

Not all companies or plants have safety committees. If there is a safety committee at your plant, it probably includes representatives from most or all departments and shifts, both supervisors and nonsupervisors. The safety committee may receive all suggestions and reports of unsafe conditions.

New Employee Orientation

An orientation ensures that anyone newly hired at a facility has all the basic safety information needed. The orientation should include:

- | | |
|---|--|
| <ul style="list-style-type: none"> • a tour of the work area • location of medical care • method of reporting injuries • location of fire and emergency equipment | <ul style="list-style-type: none"> • required personal protective equipment • incentive and awards programs • housekeeping requirements • required inspections • plant safety rules |
|---|--|

Bulletin Boards, etc.

Bulletin boards, newsletters, or some other form of communications are used to answer questions and inform all employees of changes in rules or conditions.

There are also some forms of information that the employer is required to have posted at all times.

- required federal and state safety posters
- other posters
- how to obtain emergency care
- plant safety rules
- plant emergency plan and map
- list and location of all chemicals used in every department

Training

Basic training for all employees includes

- use of powered industrial equipment
- safe handling of chemicals
- proper lifting and carrying techniques
- first aid and CPR
- evacuation procedures for fire and weather emergencies
- how to read the information on signs and tags

Each employee must be given a complete description of his or her specific job. This description must include all the **hazards** of the job. The employee must be given **specific training for that job** including all the work procedures.

The specific training for the job may include information on any or all of the following:

- forklift and crane operation
- lockout/tagout procedures
- use of respirators and other protective equipment
- cutting and welding procedures
- machine safety
- radiation, fumes, gas
- MSDSs

Incentive Programs

Some companies have incentive programs with awards for a high number of hours without any injuries. Always remember that the purpose of an incentive program is to *improve* safety. Do not ever fail to report an injury or unsafe condition to win an award.

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Unsafe Acts and Unsafe Conditions

In ordinary language, taking a shower or crossing a street could be called an unsafe act, but no one would suggest that you stop taking showers or crossing streets. In industrial safety, the term **unsafe act** always means **undesirable** (as well as unsafe) behavior.

An unsafe act does not *necessarily* result in an injury or an accident. Safety experts estimate that there are about **300** unsafe acts committed for each one that results in an injury.

This does *not* mean that you are safe the first 299 times that you do not wear goggles when

you cut metal. The probability that you will be hurt is the same every time. If you let yourself get into the habit of doing something unsafe, it is very hard to break the habit again.

Fig. 1-1 is called the accident pyramid.

SHOW: Transparency 719.01-01 (Fig. 1-1)

The accident pyramid illustrates the fact that serious, disabling, or fatal injuries usually occur only after a long series of close calls, near misses, and minor accidents. Action to prevent serious accidents must be taken at the bottom of the pyramid.

COMMENTS

Indulging yourself in taking unsafe shortcuts or not reporting unsafe conditions is a form of gambling. You are gambling that this particular unsafe act will not cost you anything or will cost you only minor inconvenience or injury; that it will not result in one of the few serious accidents and cost you part of your body, the use of your legs or eyes, or your life.

It is your employer's responsibility to design work procedures that make your job as safe as possible, to train you in these procedures, and to encourage you to have safe work habits. It is

1.14

your responsibility to perform your job *as you were trained to do it*.

It is also your employer's responsibility to give you the knowledge you need to recognize unsafe conditions and unsafe acts. **Unsafe acts** include:

- not wearing required protective equipment
- distracting other people (teasing, horseplay)
- operating any equipment you have not been trained in
- operating equipment outside its range
- failing to secure or store objects properly
- not warning or signalling other people or not giving them information they need
- trying to service moving machinery
- carrying, lifting, or loading unsafely
- disabling safety devices
- using unsafe equipment
- failing to call attention to the unsafe acts of others

Most of your safety responsibilities can be summed up as: do not commit unsafe acts and be alert for unsafe conditions.

SHOW: Transparency 719.01-02 (Fig. 1-2)

Unsafe conditions include:

- unsafe machinery or defective tools
- dangerous work areas, surfaces, or elevations
- inadequate ventilation
- inadequate lighting
- ineffective warning and alarm systems
- unsafe clothing or ineffective protective devices
- slippery walking surfaces

The workplace must be inspected regularly and often for unsafe conditions. Formal inspections are usually done by supervisors, but every unsafe condition that is checked during an inspection is also a condition you should report if it occurs between inspections.

SHOW: Transparency 719.01-03 (Fig. 1-3)

Notice all the checks of fire extinguishers. inspections must ensure that all emergency

equipment is **ready to use**. Inspections also check whether employees are wearing their required safety equipment.

Whenever you see an unsafe condition, do something about it. If it is just a box sticking out in an aisle, move it. Report spills, defective wiring, slippery floors. Do not work with defective tools.

If you believe that a condition presents an *immediate* danger to you, *by law* you do not need to perform that task until the situation is corrected.

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**Recognizing
Hazards**

ASK: What is the definition of a *hazard*?

Answer: A hazard is a condition that could cause an injury.

The four main kinds of industrial hazards are:

Electrical Electrical hazards are everywhere in the plant.

Chemical Explosive, flammable, toxic, and corrosive chemicals

Mechanical Moving machinery, gears, and work-in progress

Environmental Heat, cold, noise, radiation, and fire

SHOW: Transparency 719.01-04 (Fig. 1-4)

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Health Hazards

Safety includes staying healthy as well as avoiding injury. Some hazardous conditions cause illnesses that do not develop for years.

Toxic Substances

A substance is **toxic** if its presence in your body will make you sick. All poisons are toxic substances, and so are substances like lead and asbestos that are not chemically poisonous, but that cause illness because they interfere with the way your body works.

There are three easy ways for substances to get inside the body: by breathing (**inhaling**), eating (**ingesting**), and being **absorbed** through the skin.

SHOW: Transparency 719.01-05 (Fig. 1-5)

EXTRA
INFORMATION

The most common human diseases are reactions to the substances that enter the body on these three paths: colds (*breathing*), rashes (*skin*), and vomiting or diarrhea (*eating*).

Toxic substances can cause either an **acute** (sudden) reaction like poison gas, a **chronic** (lingering) condition like smoker's cough, or an acute disease many years later like cancer or black lung.

1.27

Noise

Hearing loss is not an inevitable result of old age. In fact, it is caused by noise. Very old people in unindustrialized societies have better hearing than our teenagers. Loud noise damages the tiny nerves in the inner ear.

(Hearing loss is discussed in detail in Chapter 11.)

1.28

Radiation

There is no radiation in most work places. If there are any sources of radiation used in your job, you should remember that there is absolutely no way that you can know whether you are being exposed to radiation except from the reading of an instrument. Nothing happens that you can feel or sense.

You must follow the manufacturer's instructions exactly when handling radiation sources.

Engineering controls are changes made to the work area, machinery or tools to minimize employees' exposure to hazards.

Noise barriers, housing of radiation sources, and ventilation systems that trap and evacuate gas and fumes from the work area are all examples of engineering control.

If engineering controls cannot be used to eliminate a hazard, each person must be protected by wearing **personal protective equipment**; for example, goggles, respirators, or protective suits.

1.30

You must be trained in the use of this protective equipment including **how** to wear it, **when** to wear it, and how to **take care of it**.

One kind of hazards that we have not yet mentioned is **injury caused by motions of the body itself**. Back injuries from improper lifting are common and familiar to everyone.

Even using the proper techniques illustrated in Fig. 1-6, many repetitions of lifting can cause injury. This is an example of **repetitive motion injury**.

SHOW: Transparency 719.01-06 (Fig. 1-6)

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Types of Accidents

Most repetitive motion injuries are to the hands and arms. Many tools are being redesigned to require less gripping and twisting.

Caught between being pinched or squeezed

Caught in an enclosure or grating

Caught on a moving object, like a conveyor belt

Fall from above from a ladder or platform

Struck by a dropped tool, a moving forklift

Struck against a wall or machine

Contacted by chemical spill, hot wires

Exposed to to toxic chemicals, fumes

Stain or overexertion

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Accidents Investigation

The purpose of an accident investigation is to keep the same accident from happening again. The investigation is usually conducted by the first-line supervisor of the department, who is looking for **facts**, not finding fault.

Almost no accidents have a single cause. The investigation should find *all* conditions that contributed to the accident. Answer all questions as fully and truthfully as you can.

Fig. 1-7 shows a typical accident report form.

SHOW: Transparency 719.01-07 (Fig. 1-7)

After the investigation is complete, an attempt will be made to change the conditions that caused the accident—perhaps by moving the machinery or improving the tools, perhaps by requiring more training.

Emergencies include fires, medical emergencies, storms, and chemical spills.

Emergencies are frightening. Conditions during a fire or tornado usually make it impossible for people to communicate with each other. During emergencies, people are in the worst possible state to analyze problems and think of solutions. That is why advance planning and drill are so important.

Repeating emergency drills until people automatically do the right thing prevents panics and wild actions and has saved many lives.

Be sure that you know the locations of the **emergency maps** that show escape routes,

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**Handling
Emergencies**

COMMENTS

exits, gas shutoffs, and the **locations of the fire extinguishers**.

You are responsible for fire prevention, and should be trained in fire prevention, but that is where your responsibility stops.

Never become involved in fighting a fire that endangers you.

1.42

If you and your fellow employees are trained in **first aid** and **CPR** (*cardiopulmonary resuscitation*), you may some day be able to save someone's life when the medical department cannot get there in time.

1.43

If your facility is in an earthquake, tornado, or hurricane area, you will have evacuation drills and special storage precautions.

1.44

Do **not** attempt to clean up a chemical spill unless you have been trained to do it.

“Spill training” includes safe clean-up and legal disposal. You can cause enormous problems by pouring something down a drain.

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Safety Off the Job

Unless you have an unusually dangerous job, your chances of being injured or killed **triple** as soon as you *leave* the plant.

The most dangerous place you can be is in your car. The second most dangerous place is your home.