Course Learning Outcomes for Unit III

Upon completion of this unit, students should be able to:

2. Apply occupational safety and health concepts to workplace scenarios.
   2.1 Explain the causative model(s) for an accident in a workplace.

5. Evaluate common workplace hazards.
   5.1 Investigate an accident in a workplace.
   5.2 Determine the root cause(s) of an accident based on an investigation.

Course/Unit Learning Outcomes	Learning Activity
2.1	Unit Lesson Chapter 3, pp. 29–46 Unit III Case Study
5.1	Unit Lesson Chapter 8, pp. 165–181 Unit III Case Study
5.2	Unit Lesson Chapter 3, pp. 29–46 Unit III Case Study

Required Unit Resources

Chapter 3: Theories of Accident Causation, pp. 29–46

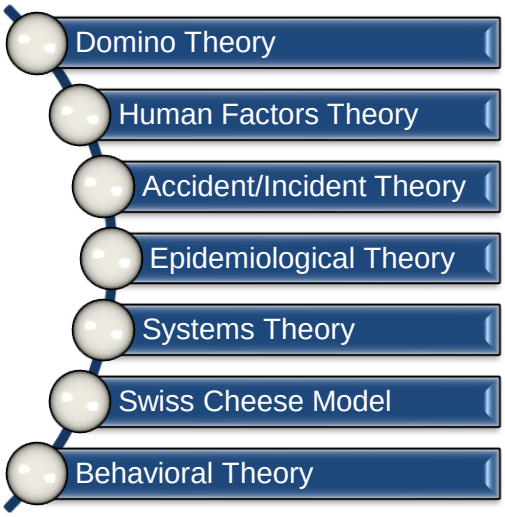
Chapter 8: Accident Investigation and Reporting, pp. 165–181

Unit Lesson

A primary focus of your work as a safety professional is to prevent injuries and illnesses from occurring in the workplace. In many cases, the effectiveness of your safety efforts is measured by the injury and illness rates for the location. This is often seen as a billboard somewhere in the facility touting the number of days that have passed since the last OSHA recordable injury. Hopefully, most of you have worked for extended periods of time without seeing any injuries or illnesses. If you work in the safety field for an extended period of time, you will eventually see injuries and illnesses occur. For many of you, dealing with minor injuries can be a regular part of your daily routine.

Many of the occupational injuries that occur are fairly minor in nature, not even rising to the level of being OSHA recordable. Even these minor injuries cost companies in lost time from completing work tasks as well as the time and costs related to first aid supplies or on-site medical staff. The primary efforts of many safety professionals are prevention of more serious injuries and illnesses that result in lost time for employees and increased injury and illness rates. Understanding some basic causes of accidents can assist you in establishing programs to reduce both minor and major injuries and illnesses.

Chapter 3 of the textbook presents some of the more common theories for why accidents occur. If you review the various theories that are presented in the textbook, you will see that there are two basic root causes that are discussed: human error and unsafe conditions. Basically, an employee does something unsafe, or the process an employee is performing has an unsafe condition inherently present. In many cases, these two causes interact with each other. For example, a saw has a guard laying on the bench, but it is not permanently installed. Employees are supposed to attach the guard prior to using the saw, but some employees skip the step because it is easier to perform the job without the guard. When an employee amputates a finger using the saw, the cause is a combination of an unsafe condition being present and the employee not using the safeguard that was present.



Some of the many theories of accident causation *(Goetsch, 2019)*

Both human factors and unsafe conditions can be evaluated to determine the most common reasons present in a system. Understanding why an individual acts in an unsafe manner or why a facility would allow an unsafe condition to be present can help you determine the most efficient methods to correct the conditions and prevent injuries and illnesses. After all, if employees are performing an operation in an unsafe manner because that is how they were taught to perform the operation, simply placing cut-proof gloves in the tool crib will probably have very little effect on the unsafe acts.

Understanding why employees perform tasks in an unsafe manner requires an understanding of human nature. The textbook contains a section on the *human factors theory of accident causation* (p.46) that explains some of the reasons employees perform work in an unsafe manner. If you have worked in the safety field for any length of time, you can probably recall at least one worker who exhibited some of the factors discussed in the section.

One of the most common reasons given by employees for performing a task in an unsafe manner is “That is how we have always done it, and no one has been hurt yet!” This excuse would fit into both the *inappropriate response* and *inappropriate activities* categories of the human factors theory of accident causation. This is probably one of the more difficult factors to overcome. The employee who typically says this has been working in the job for a long time and is considered the “expert” on the task. Whenever new employees are hired, they may be properly trained on the safe practices associated with the task but change their work habits based on input from this expert. One interesting note is that if the so-called expert is injured, he or she tends to blame the company for not providing a safe work area, even if he or she was performing the task incorrectly.

Another common cause of human error is having employees performing a task for which they are improperly trained. In many manufacturing settings, there is a lot of pressure to meet production numbers. Many times, compensation for managers is based on meeting these production figures. In these cases, it sometimes becomes a rush to get new employees on the production lines and working, and training suffers. Additionally, even if employees have been trained properly for one task, they may be temporarily moved to another task because of absences, and they have not been trained properly for that task. This cause would fit into the inappropriate activities category of the human factors theory of accident causation.

Of course, in some cases the human factor that is associated with an unsafe act is related to a personal problem. Employees who have personal problems at home may be distracted to the point that they do not perform the task correctly. The personal problems could include marital stress, problems with their children, or financial worries. They may have to work another job after they finish their primary job, leaving them fatigued. Some employees also have problems with addictions to drugs, including alcohol. With the increase in opioid addictions, there are more employees under the influence of drugs at workplaces today. These factors can also be extremely difficult to detect and correct because of privacy laws.

Unsafe conditions can also have many different causes. In some cases, machines are old enough that they do not have safeguards that are required on newer machines, and the employer chooses not to spend the

money to update the safeguards. This is very common for noise exposures. Newer machines, such as hydraulic presses, typically have some noise-deadening materials built in to reduce noise levels. Older machines typically do not have as much noise-deadening materials, resulting in higher personal exposures. There are noise-deadening materials that can be installed, but they can be expensive, and many employers simply require workers to wear hearing protection. This is one reason noise-induced hearing loss is one of the most frequent workers' compensation claims.

Another problem with unsafe conditions is the removal of safeguards to increase production. In most cases, adding some type of machine guard will decrease the number of parts that can be produced. If a greater emphasis is placed on production than safety by management, the safeguards may be removed to increase production. In this case, the worker may be told "just be careful and you will not get hurt." Take, for instance, the case of a worker who was missing the tips of three fingers from accidentally cycling a press with no guards while his fingers were in the press. A light curtain was installed so he could not put his hands into the press and cycle the press. He had used cardboard to block out areas of the press and allow his hands to go into the press to decrease the time it took to remove parts from the press.

Ergonomics is another area that can cause unsafe conditions. We will study ergonomics issues in more detail in Unit IV, but if the tools that an employee is required to use for a task are incompatible with his or her body, injuries can occur. Most machines and tools are manufactured for the *average* individual. Therefore, you will typically have some workers for whom the tools and machines are not designed properly.

A new area of science that is getting a lot of attention is genomics. Scientists are now able to analyze the gene sequences of individuals. Based on research, the genetic information can be used to predict the risks of certain diseases for individuals. How does this apply to accident causation? If we look at exposures to chemicals in the workplace, we typically see an uneven response to the exposures. In other words, some individuals report health symptoms that may appear quite severe, while others have no overt symptoms at all. This is due to the differences in susceptibility between individuals that can be related to genetic differences. There are some scientists who predict that genetic testing can be used to predict who will develop specific illnesses as a result of exposure to specific compounds in a workplace. This practice is complicated because of privacy rules. Congress passed the Genetic Information Nondiscrimination Act of 2008 to protect individuals' personal genetic information from employers and insurance companies.

A task that many safety professionals will have to perform is investigating accidents after they occur. Investigating occupational accidents is similar to the investigations you see on TV shows. Basically, you are trying to collect the facts associated with the accident. The methods you use to collect the facts may not be the same as the methods used by other safety professionals. As long as you obtain the facts and can use those facts to prevent the same accidents from occurring in the future, there is no right and wrong way to investigate.

However, over the years, safety professionals have developed some basic steps for accident investigation. A typical approach to an investigation is summarized in Chapter 8 of the textbook. Review that approach and see if it resembles an investigation you have performed or are familiar with. What you should notice is that the approach is similar to a basic crime scene investigation. You try to isolate the scene, record all evidence as soon as possible, document what happened with photos/video, identify any witnesses, and interview the witnesses (Goetsch, 2019).

Another important task for the safety professional is understanding when and to whom injuries and illnesses should be reported. There are several potential situations when reporting is required. Of course, OSHA has regulations that require the reporting of injuries and illnesses. Most of you are probably familiar with OSHA recordable injuries and illnesses that must be recorded on the appropriate OSHA form and summarized each year. However, there are also some injuries and illnesses that require you to notify OSHA (or state OSHA) within eight hours. The instances were recently changed by OSHA and now include when an employee is killed on the job, suffers a work-related hospitalization, amputation, or loss of an eye. The company or corporation you work for may also have some internal reporting requirements.

References

Genetic Information Nondiscrimination Act of 2008, Pub. L. No. 110–233, 122 Stat. 881 (2008). https://www.eeoc.gov/statutes/genetic-information-nondiscrimination-act-2008

Goetsch, D. L. (2019). *Occupational safety and health for technologists, engineers, and managers* (9th ed.). Pearson.

Suggested Unit Resources

In order to access the following resources, click the links below.

The most effective accident investigations typically are well organized. Though brief, the following link summarizes what the author believes are four critical stages to an accident investigation.

Incident investigations: Four critical stages. (2016, May). *Professional Safety, 61*(5), 19. https://search-proquest-com.libraryresources.columbiasouthern.edu/docview/1789356555?accountid=33337

In this unit, we also learned about human error as a contributing factor to accidents. The following article reviews how making an immediate assumption of human error during an investigation can lead to errors in the investigation.

Malhotra, S. (2018, January). Behavioral assumptions in root-cause analysis. *Professional Safety, 63*(1), 43–44. https://search-proquest-com.libraryresources.columbiasouthern.edu/docview/1985534144?accountid=33337

One of the concepts we are learning about this week is causal factors. Sometimes, it is very difficult to determine the root causes of accidents. The following presents some ideas about determining the root causes of accidents.

Manuele, F. A. (2016, May). Root-causal factors: Uncovering the hows & whys of incidents. *Professional Safety, 61*(5), 48–55. https://search-proquest-com.libraryresources.columbiasouthern.edu/docview/1789356418?accountid=33337

OSHA places a high level of emphasis on the need to perform accident investigations. Note that OSHA prefers the term *incident* instead of *accident*. The following link provides a guideline from OSHA on performing incident (accident) investigations. The document contains some excellent checklists that you can use for accident investigations.

Occupational Safety and Health Administration. (2015, December). *Incident [accident] investigations: A guide for employers.* United States Department of Labor. https://www.osha.gov/dte/IncInvGuide4Empl_Dec2015.pdf

Learning Activities (Nongraded)

Nongraded Learning Activities are provided to aid students in their course of study. You do not have to submit them. If you have questions, contact your instructor for further guidance and information.

The Bureau of Labor Statistics publishes the data that OSHA collects on injury and illness rates each year. The most recent data is listed on the BLS website. Click the link below, and review some of the spreadsheets from the last few years.

U.S. Bureau of Labor Statistics. (n.d.). *Industry injury and illness data*. https://www.bls.gov/iif/oshsum.htm

See if you can detect any trends in which industries have the highest injury and illness rates. Can you think of any of the theories of accident causation from Chapter 3 of the textbook that might explain why one industry might continually have a higher rate than another industry?