Learning Objectives

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

1. Explain the need for effective hazard identification and control procedures.
2. Describe the types of workplace changes that dictate a need to conduct a new hazard analysis.
3. Effectively use a hierarchy of control measures to reduce or eliminate hazards.
4. Discuss the limitations of controlling hazards with administrative controls and safe work practices.
5. Identify the benefits and limitations of recognition and disciplinary systems in relation to controlling workplace hazards.
6. Develop and document an effective Job Hazard Analysis.
7. Define the key terms associated with mishap causal factors.
8. Apply the “Five Whys” technique in determining the root cause of an incident.
9. Describe basic incident causation models.
10. Effectively use the 5M Model of Safety Engineering to identify mishap causes and corrective actions.
11. Conduct an incident investigation, identify root causes, and develop a corrective action plan.

Unit Summary

In this unit, we begin discussion of the safety program elements needed to support a strong safety culture. We start in Chapter 10 with the importance of creating a comprehensive hazard inventory through surveys and inspections. There are three major actions needed to control hazards: (1) comprehensive surveys, (2) change analysis, and (3) job hazard analysis. Once developed, the hazard inventory becomes a living document and is reevaluated whenever changes in facilities, equipment, processes, and people take place. These subsequent surveys can help find new hazards that have been introduced into the processes, operations, or procedures.

Chapter 11 describes ways of controlling hazards using the detailed hierarchy of engineering controls, administrative controls, and personal protective equipment. Establishing effective recognition and discipline programs are discussed as means to encourage employees to adhere to established safe work practices and procedures. Flow diagrams are offered to describe accurate hazard analysis. Limitations to controlling hazards with safe work practices are discussed along with inspection and enforcement actions. Information is provided on tracking hazards, writing inspection reports, tracking action plans by committee, recognition systems, and disciplinary systems. The chapter concludes with a discussion of reporting systems and preventive maintenance programs.
Jumping ahead to Chapter 15, we learn more about Job Hazard Analysis (JHA), a proven technique for involving employees in identifying hazards and determining control measures. Figures, tables, and checklists are provided for breaking down the various aspects and elements of the Job Hazard Analysis. The objective is to develop a JHA that is user-friendly and one that everyone can read and understand the hazards involved. While JHAs are only one component of an overall strategy, once they are established, they become the focal point for training new employees and ensuring all employees are following prescribed procedures. It is important to understand that the JHA is not a mandatory requirement or a standard. It is considered a management tool and a best management practice (BMP), going beyond the OSHA standard.

Experienced safety professionals understand that while prevention and control are key elements of a successful safety management system, incidents and accidents still may occur, and there must be procedures in place to ensure thorough investigations are conducted and documented. Chapter 12 describes several theories of mishap causation and shows how to use these theories in conducting an incident investigation. Effective investigations include the objective evaluation of all the facts, opinions, statements, related information, and identification of the root cause(s) and actions that will be taken to prevent recurrence. The chapter explains the “Five Whys” of the root cause analysis and offers a flow chart along with basic causation models. An incident investigation flowchart is presented that includes the necessity for a corrective action plan and comprehensive report that allows management to make further risk control decisions that will prevent future incidents.

The Heinrich Theory is discussed. This “domino” theory is based on assumptions that accident causation can be described as a chain or sequence of events leading to an accident and/or consequences. In 1986, Frank Bird and George Germain modified the domino theory to develop another accident causation model that addressed its key concepts of loss control. They identified four essential management functions of planning, organizing, leadership (directing), and control.

The chapter also examines the four key elements of a safety system: (1) equipment, (2) environment, (3) people, and (4) management. The 5M model of safety engineering is presented, which identifies the mission, man, machine, media, and management as key concepts and elements of its program.

The primary purpose of the incident investigation is to prevent future occurrences. Therefore, when the investigation is performed properly and completely, the results of the investigation can be used to initiate corrective action. The recommended preventive actions should make it very difficult, if not impossible, for the incident to recur.