Industrial Hygiene

Preparation

1. Read Company Policy Chapter
2. Make _____ Copies of this Lesson Plan for Personnel
3. Make Transparency, procure transparency pens, etc.
4. Coffee, tea, snacks

Other:

Material

1.

Objective

. After completion of this section the employee will be able to:

- Explain what industrial hygiene evaluations entail.
- Distinguish between qualitative and quantitative exposure assessments.
- Describe types of toxicants encountered at the workplace.
- Describe adverse health effects caused by exposure to hazardous materials
- List factors affecting severity of exposure to hazardous materials.
- Discuss methods used to minimize exposure to hazardous materials.

Background

Industrial hygiene is the anticipation, recognition, evaluation, and control of health hazards in the workplace that may cause illness, discomfort, or lack of well-being among workers or among members of the community.

Industrial hygienists support you and your managers to make sure that the Company is a healthful and safe place to work.

Notes

Lesson

Types of Industrial Hygiene Hazards

The four types of industrial hygiene hazards to which you could be exposed at work are:

- Chemical hazards: liquids, solids, fibers, mist and dust, fumes and smoke, gases and vapors.
- Physical hazards: noise, vibration, temperature extremes, and non-ionizing radiation such as infrared and ultraviolet radiation from lasers, microwaves, or radio frequency generated during the operation of accelerators.
- Biological hazards: insects, molds, bacteria, viruses, and yeasts.
- Ergonomic factors: video display terminals (VDTs) and repetitive motion.

Industrial Hygiene Evaluations

We identify employee exposure through Industrial Hygiene evaluations. The four principles of Industrial Hygiene are:

- **Anticipation:** planning ahead by identifying hazards and the control of hazards before a new operation begins.
- **Recognition:** identifying the hazards as they exist.
- **Evaluation:** determining the extent or degree of the hazards.
- **Control:** identifying ways to reduce or eliminate the hazards.

Hazard Evaluation

Hazards in your workplace are evaluated by the job supervisors with assistance from the Safety Officer. Hazards are evaluated qualitatively and quantitatively;

- Qualitative evaluations are done by smelling, seeing, hearing, and by noticing body signs and symptoms (e. g., rash, headaches, nausea, etc.)
- Quantitative evaluations are done by taking physical measurements in the workplace. This typically includes sampling a specific contaminant in the air that the worker is breathing using air monitoring instruments or measuring noise and radiation levels using noise dosimeters and radiation meters. Quantitative evaluations are more specific because an actual measurement of the hazard is performed.

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Types of Toxicants

Toxicants are classified according to how they affect the body. They are classified as:

Asphyxiants: Gases that deprive the body of oxygen:

- Simple Asphyxiates are gases that at high concentrations can displace enough air to cause suffocation. Examples include nitrogen, helium, and argon.

- Chemical Asphyxiates are gases that prevent the lung tissues from getting enough oxygen. Examples include: carbon monoxide and cyanide. Carbon monoxide binds with hemoglobin 200 times more readily than oxygen. Cyanide prevents the transfer of oxygen from blood to tissues by inhibiting the necessary transfer enzymes.

Irritants: Chemicals that irritate the air passages, causing constriction of the airways and possibly leading to edema (liquid in lungs) and infection. Examples include chlorine, ammonia, sulfur dioxide, and ozone.

Fibrosis Producers: Chemicals that produce fibrotic tissue which, if massive, blocks airways and decreases lung capacity. Examples include silica, asbestos and fiberglass.

Carcinogens: Chemicals that cause cancer. Examples include, benzene, asbestos, carbon tetrachloride, etc.

Corrosives: Chemicals that damage your skin. Some exposures to corrosives can result in permanent damage to the skin or eyes. Corrosive chemicals includes both acids and bases (caustics). Some examples of corrosives include, Hydrochloric Acid, Sodium Hydroxide, Potassium Hydroxide, and Ammonium Hydroxide.

Health Effects

The extent of effect from an exposure to a hazardous chemical depends on several variables:

- Route of entry (i. e., inhalation, absorption, ingestion, injection).
- Concentration of exposure.
- Frequency of exposure.
- Duration of exposure.
- Personal susceptibility (i. e., gender, age, health, etc.).

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Duration and Frequency of exposure effect toxicity in two ways:

Acute: Effects are adverse effects that occur immediately following a one- time exposure lasting less than 24 hours. Some examples of acute toxic effects are burning or itchy eyes, nausea, dermatitis, and dizziness.

Chronic: Effects are adverse effects that occur after a long period of time following many exposures. Some examples of chronic toxic effects are cancer, liver damage, and kidney damage. Worker health monitoring is key in identifying these types of conditions, because many show no visible symptoms.

Exposure Control Methods

We control our exposure to hazardous materials by using:

Engineering Controls are mechanical systems which include; local ventilation systems, remote handling, laboratory hoods, material containment, and acoustical absorption.

Administrative Controls are safety procedures that the worker is trained to do and they include; proper work practices, limiting exposure time, following standard operating procedures, and proper hygiene (washing up before eating lunch).

Personal Protective Equipment (PPE) is safety equipment that can be worn to minimize exposure to the hazardous material and includes; respirators, hearing protection, chemical protective coveralls, goggles, gloves, etc. PPE must be worn if engineering and administrative controls do not eliminate the hazard.

Closure

The personal hygiene, attire, and general good habits of the employee play a crucial role in keeping the workplace safe and clean.

What questions do you have?

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