



Lesson 5

PRACTICE OCCUPATIONAL HEALTH AND SAFETY PROCEDURES

Auto-Engine Rebuilding NCII

LEARNING OBJECTIVES

After the completion of this lesson, learners should be able to:

1. identify hazards and risks
2. evaluate hazards and risks
3. control hazards and risks
4. maintain occupational safety and awareness



Unit 1: Identify hazards and risks

In any place, or corner, hazard could be present. At home, on the street, in school or in the workplace, anything could happen and may cause some damage to an individual or to property. Example: anything could happen with an extension cord lying on a floor, from a simple tip-off to electric shock or even more.

What is HAZARD?

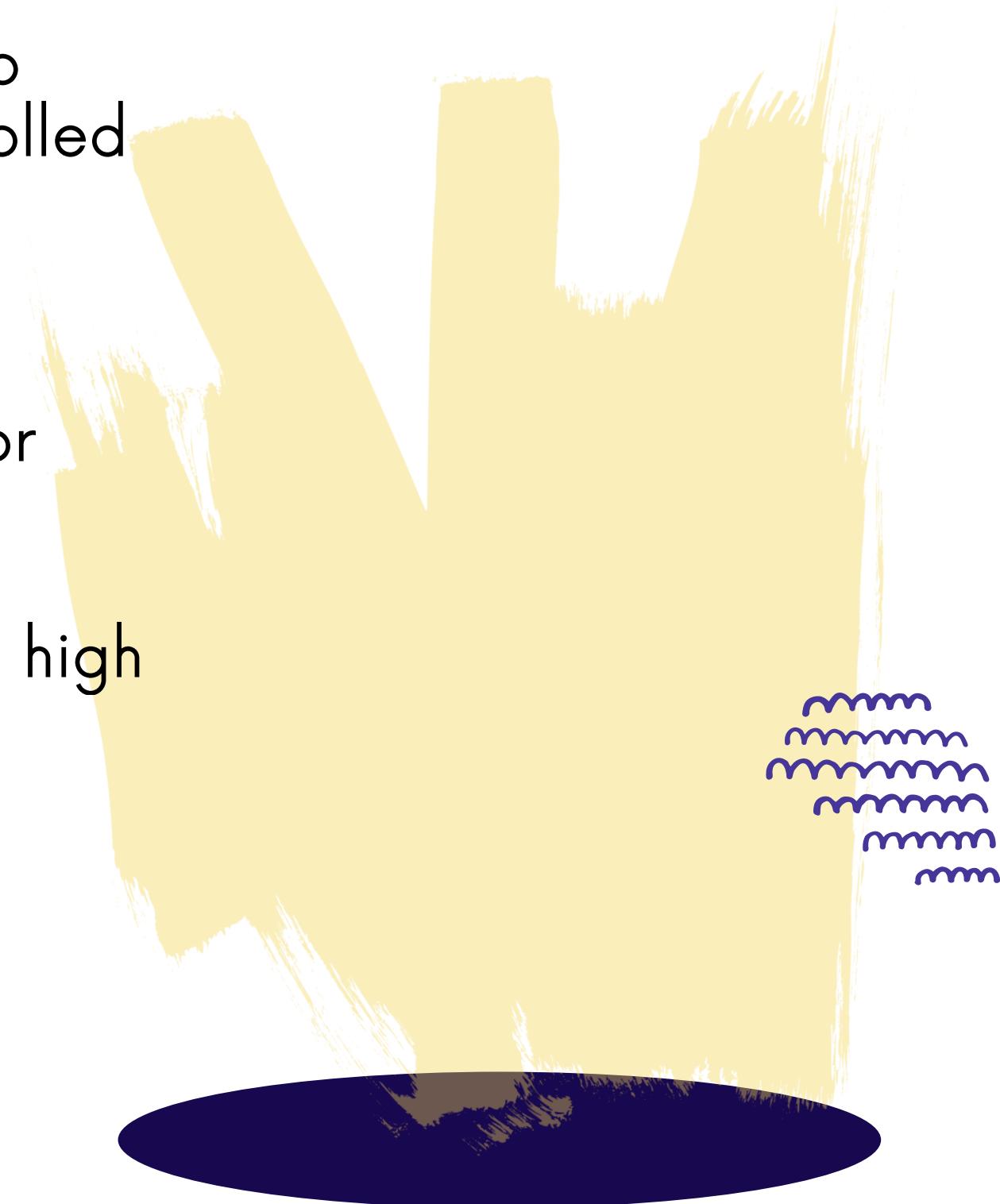
- A hazard is any source of potential damage, harm or adverse effects on properties or someone's health under certain conditions at work. Workplace hazards can come from a wide range of sources. General examples include any substance, material, process, practice, etc that have the ability to cause harm or adverse health effect to a person under certain conditions. See table below

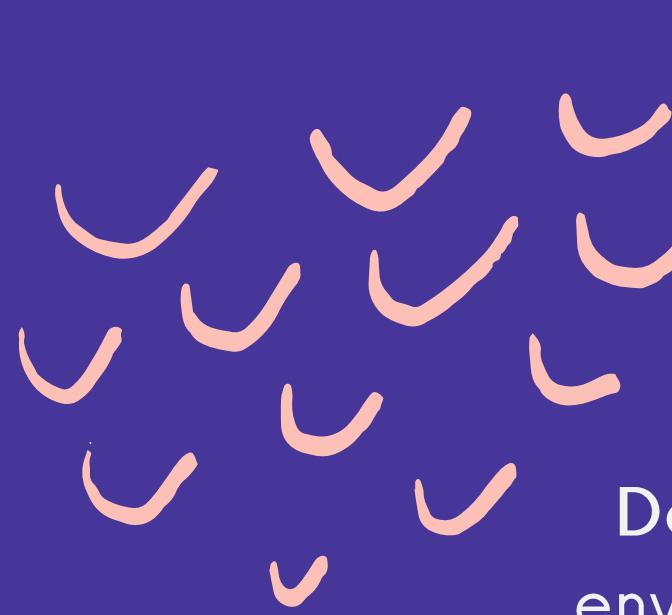
Examples of Hazards and Their Effects

Workplace Hazard	Example of Hazard	Example of Harm Caused
Object/tool	Knife	Cut
Substance	Benzene	Leukemia
Material	Asbestos	Mesothelioma
Source of Energy	Electricity	Shock, electrocution
Condition	Wet floor	Slips, falls
Process	Welding	Metal fume fever
Practice	Hard rock mining	Silicosis

As shown in the table above, workplace hazards also include practices or conditions that release uncontrolled energy like:

- an object that could fall from a height (potential or gravitational energy),
- a run-away chemical reaction (chemical energy),
- the release of compressed gas or steam (pressure; high temperature),
- entanglement of hair or clothing in a rotating equipment (kinetic energy), or
- contact with electrodes of a battery or capacitor (electrical energy).





Modes / Forms of a hazard

Dormant – The situation has the potential to be hazardous, but no people, property, or environment is currently affected by this. For instance, a hillside may be unstable, with the potential for a landslide, but there is nothing below or on the hillside that could be affected.

For a shop work area, dormant hazard is an undetected hazard created by the design of equipment or layout of the workshop area.

Armed – The situation has the potential to be hazardous and there are people, property, or environment that is in potential harm's way. This is a dormant hazard that has become armed and ready to cause harm during certain work circumstances.

Active - A harmful incident involving the hazard has actually occurred. Often this is referred to not as an "active hazard" but as an accident, emergency, incident, or disaster. This is an armed hazard triggered into action by the right combination of factors. At this point it is too late to take any preventive action to escape injury or avoid death

Classes of hazard

	<i>Example of forms / modes of hazard</i>		
	<i>Dormant</i>	<i>Armed</i>	<i>Active</i>
<i>Snowy cliff</i>	<i>Anytime Avalanche could take place while no one on its base</i>	<i>Skiers are on the base of the snowy cliff</i>	<i>An avalanche occur while some skiers are on the base of the cliff</i>
<i>Auto repair shop</i>	<i>An engine is hooked-up by a chain block (hoist)</i>	<i>The engine is raised-off from the car's engine compartment</i>	<i>The chain snaps and the engine knocks down on the car.</i>

Hazards are classified into six different types. They are



Physical - includes floors, stairs, work platforms, steps, ladders, fire, falling objects, slippery surfaces, manual handling (lifting, pushing, pulling), excessively loud and prolonged noise, vibration, heat and cold, radiation, poor lighting, ventilation, air quality

Mechanical and/or electrical - includes electricity, machinery, equipment, pressure vessels, dangerous goods, forklifts, cranes, hoists

Chemical - includes chemical substances such as acids or poisons and those that could lead to fire or explosion, cleaning agents, dusts and fumes from various processes such as welding

Biological - includes bacteria, viruses, mold, mildew, insects, vermin, animals

Psychosocial environment - includes workplace stressors arising from a variety of sources.

Ergonomic- repetitive movements, improper set up of workstation, etc.,

WHAT IS RISK?



Risk is the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard. In an auto repair shop, doing most of the jobs place a technician in risky situation. Example, the mechanic is exposed to danger while performing under chassis repairs, he is at risk. There are dangers that may actually become an accident like a bolt snaps while loosening and the mechanics hand strikes hard on other component. It may also apply to situations with property or equipment loss, like the engine in above example would experience damage from a knock down, and the car itself would be damaged too



Hazard VS Risk



Mostly these two words are used interchangeably with one another. From above statements in this lesson, hazard and risk have its own identity which are closely related to one another. Hazard is the possible danger that could occur when some factors would trigger such event while risk is the possible harm which may result if given danger becomes active. Simply hazard is a possible cause while risk is a possible negative effect.

IDENTIFYING HAZARDS AT WORK

The process of identifying and fixing potential hazards in the workplace is called hazard management - a simple procedure where you assess and control the risk of hazards to workers. A workplace hazard is something that has the potential to harm the health and safety of people at work.

Some identified workplace hazards:

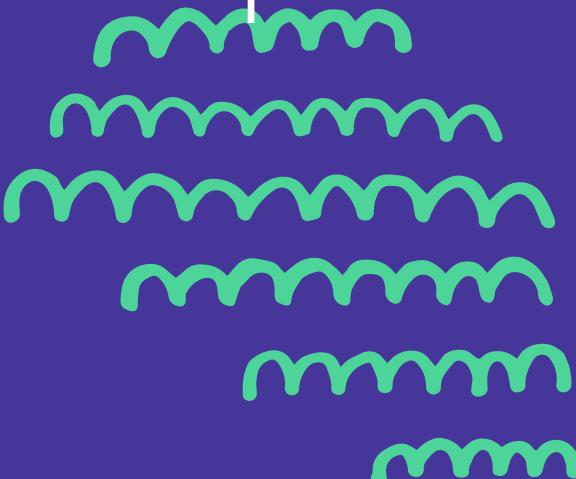
- **Manual handling** includes any activity that requires a person to lift, push, pull, carry, hold or move an object, person or thing. The weight of the object, frequency of manual handling, avoiding sudden or jerky movements, planning the move or lift, lighting and surfaces all need to be considered.





Lifting and moving equipment and materials, panel beating, and working in awkward postures (such as removing or replacing engine parts under car bonnets) are some examples of manual handling tasks you may have to do in the automotive industry

At times, your tasks may involve bending and stretching as well as twisting sideways, or working with materials and equipment above shoulder height. All of these increase the risk of manual handling injury. Many engine parts are too heavy to lift safely, and storage of items such as vehicle tires on racking, while it may be easy at ground level where they can be rolled in, presents a manual handling risk if you attempt to lift them.



- Machinery and Equipment Poor design, poor maintenance, inexperience and lack of training increase the risk of injury from tools and equipment and its operators.



Hoists are used to elevate vehicles so repairs can be made safely by people working beneath the vehicle. The safe operation of hoists is essential, and depends upon competent operators and strict maintenance and inspection routines. Every hoist must be subjected to a pre-operation check, and routine inspection and maintenance must be carried out at least every three months.

Air compressors are dangerous and should never be used to blow dust or dirt from clothing or work materials. Compressed air accidentally blown into an open wound can be fatal because air can be forced into bloodstream. Asbestos has been used in some vehicle components such as brake lining, there is the possibility that asbestos fiber may be found in automotive workshops: compressed air should never be used to blow what may appear to be dust from these items. Engines have exposed moving parts (fans and belts) which could catch fingers, and exhaust emissions can be fatal if they build up in an enclosed area. If a vehicle moves while a worker is beneath it, a fatality or serious injury could result.

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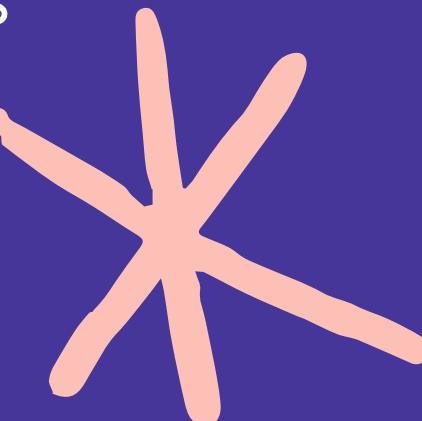
- **Powered Tools and Hand Tools** Many of the tools used in the automotive industry are powered by electricity. Your employer must make sure all electrical machinery and equipment are kept in good working order. Electrical plugs and switches must be checked regularly to make sure they are not damaged. Leads can become split or frayed, and these too must be inspected for wear each time they are used. Electrically powered tools must be tested and tagged regularly

Hand tools – such as spanners, wrenches and screwdrivers – will be used in every job. The most common injuries from use of hand tools are to the hands and fingers. Using the correct tools is an important way to avoid these injuries.

Welding operations generate hazardous fumes and should be separated from other workshop activities and from workers who may not be protected by fume extraction systems, ventilation or appropriate PPE. It may be possible to weld out of doors in good weather; at times, risk controls will be needed to prevent exposing the welder and other workers to risk.



- Slips, Trips and Falls A slip or fall can cause injury to the arms, legs, back, neck or head. Neck and head injuries can cause damage to the spinal cord and nervous system. Many employees have suffered permanent disabling injuries as a result of a fall. Poor „housekeeping' in the automotive industry leads to slips, trips and falls. Engine parts, air lines and hoses left on the workshop floor can all result in preventable accidents. Metal bins should be provided for waste disposal. These should not be allowed to overflow.

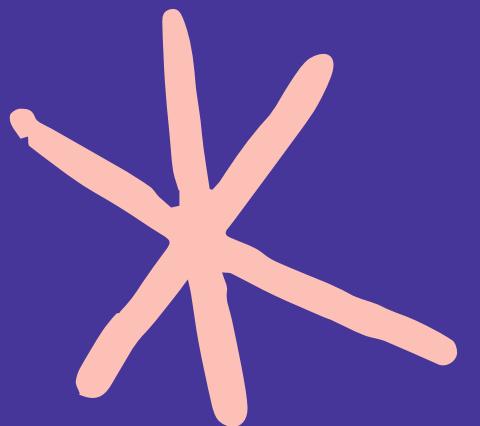


- Confined Spaces

Some automotive workshops have pits to enable work to be done if a hoist is not available. The vehicle is driven over the pit, and the mechanic works from beneath. This work should never be done by someone working alone: a second person should be on hand (outside the pit) to monitor the work and to provide assistance. Because carbon monoxide (from the vehicle exhaust) is heavier than air, the fumes may build up in the 'confined space' under the vehicle. These fumes need not be only from the vehicle being worked on: if other engines are running nearby, there is still a significant risk of exhaust emissions collecting in the pit. Good ventilation is essential in automotive workshops. Engine bay doors should be fully open at all times. If weather conditions prevent this, the work must be evaluated and tasks such as spray painting, which could result in a build-up of fumes, should be postponed.

- Confined Spaces

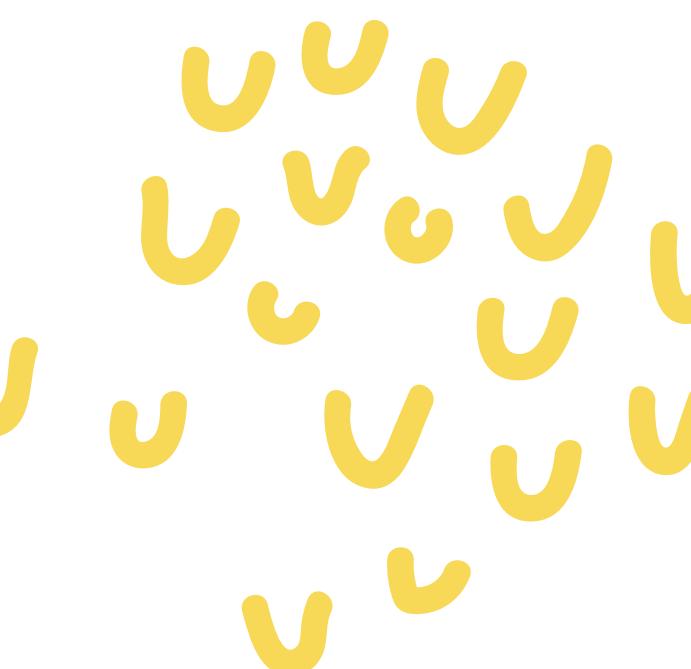
Respirators will be necessary for a number of jobs in an automotive workshop. Dust masks do not provide protection against vehicle fumes and gases, or paint drift from spraying operations. Employers must find out what kind of breathing protection is needed and make sure all workers are issued with it and instructed in its correct use.



- Noise Excessive noise can cause permanent hearing loss and is probably the most common cause of hearing loss in adult males. Hearing loss limits a person's ability to communicate at work, home and socially. There is no medical treatment and hearing aids offer limited benefit.

Employees in the automotive industry work with noisy tools and machinery such as wheel removers, compressors, grinders and drills. While in an automotive workshop, you may be exposed to noise levels exceeding 85 decibels or dB(A) that could lead to hearing loss.





Hazardous Substances A hazardous substance is any substance, which can potentially harm the health and safety of workers. Labels and material safety data sheets (MSDS) provide OHS information about the substance.

1. Hazardous substances and dangerous goods. The automotive industry requires the use of dangerous goods (such as petrol and gas) and hazardous substances (such as acids, oils, diesel and solvents).
2. Petrol containers and gas cylinders must be stored securely, away from heat sources and out of the path of vehicle traffic. These are highly flammable substances and could cause fatality and serious injury if not carefully handled and stored.
3. Solvents are often used as cleaners or degreasers. They can enter the body when a person breathes in their vapor, through skin contact, or through the mouth from contact with food or fingers. Solvents can impair memory and cause headaches, dizziness, fatigue, mood changes or nausea. Exposure to high levels of solvents can cause liver damage, unconsciousness, death and cancers.



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4. Spray paints contain harmful substances. Inhaling paint fumes may cause occupational asthma. Long term exposure can affect the brain, damage the reproductive system and cause kidney or liver damage. Contact with the skin may cause dermatitis (an inflammation of the skin).
5. Batteries contain acid and must be treated with caution. If you are asked to handle batteries, you must be given instruction and provided with appropriate PPE - rubber gloves, eye protection (you may need goggles to avoid splashes), overalls and solid work boots. (You should always wear work boots - not sneakers or soft shoes - in the automotive industry, no matter what job you are doing.)

DIFFERENT HAZARDOUS MATERIAL / SUBSTANCE AND ITS EFFECT



CORROSIVE MATERIAL

Corrosive materials can attack (corrode) metals or cause permanent damage to human tissues such as the skin and eyes on contact. Burning, scarring, and blindness may result from skin or eye contact. Corrosive materials may also cause metal containers or structural materials to become weak and eventually to leak or collapse. Ammonia, fluorine, and hydrochloric acid are examples of corrosive substances.



FLAMMABLE AND COMBUSTIBLE MATERIAL

Flammable or combustible materials will ignite and continue to burn if exposed to a flame or source of ignition. Materials are classified as a flammable gas, flammable aerosol, flammable liquid, combustible liquid, flammable solid, or reactive flammable material. Methane, acetone, aniline, and lithium hydride are examples of flammable materials.



OXIDIZING MATERIAL

An oxidizing material may or may not burn itself, but will release oxygen or another oxidizing substance, and thereby causes or contributes to the combustion of another material. Ozone, chlorine, and nitrogen dioxide are oxidizing materials. These chemicals will support a fire and are highly reactive.



DANGEROUSLY REACTIVE MATERIAL

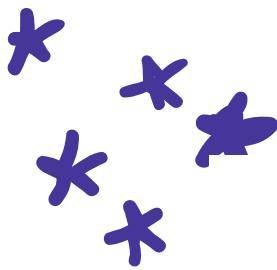
Dangerously reactive materials may undergo vigorous polymerization, decomposition or condensation. They may react violently under conditions of shock or an increase in pressure or temperature. They may also react vigorously with water to release a toxic gas. Ozone, hydrazine, and benzoyl peroxide are examples of dangerously reactive materials.



COMPRESSED GAS

A compressed gas is a material which is a gas at normal room temperature (20 C) and pressure but is packaged as a pressured gas, dissolved gas or gas liquified by compression or refrigeration.

The hazard from these materials, aside from their chemical nature, arises from sudden loss of integrity of the container. A compressed gas cylinder is usually quite heavy and when ruptured can become a projectile with the potential to cause significant damage. Acetylene and oxygen are examples of compressed gases.

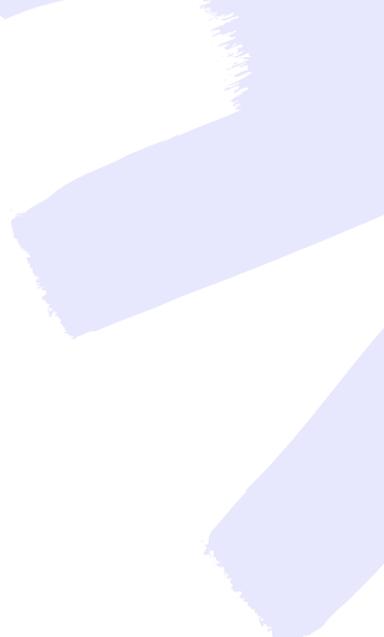


POISONOUS AND INFECTIOUS MATERIALS

1- Materials Causing Immediate and Serious Toxic Effects

These materials may be classified as toxic or very toxic based on information such as LD50 or LC50.

Examples: Styrene, hydrogen cyanide are very toxic substances.

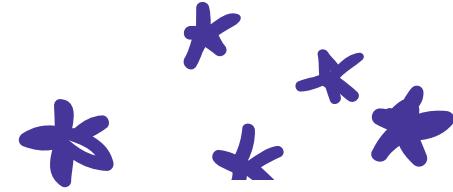


2 - Materials Causing Other Toxic Effects

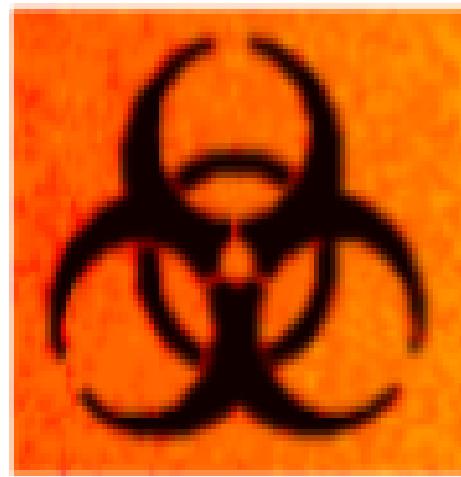
A pure substance or mixture that may be any one of the following: a carcinogen, teratogen, reproductive toxin, respiratory tract sensitizer, irritant or chronic toxic hazard.

Examples: Asbestos causes cancer, ammonia is an irritant.



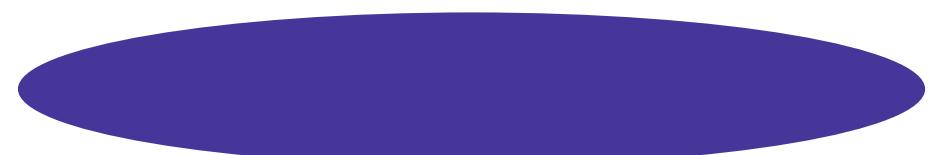


3 - Biohazardous Infectious Material



This classification includes any organisms and the toxins produced by these organisms that have been shown to cause disease or are believed to cause disease in either humans or animals.

For example, a blood sample containing the Hepatitis B virus is a biohazardous infectious material. It may cause hepatitis in persons exposed to it.

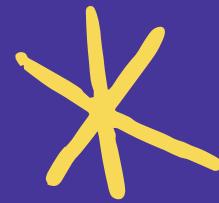
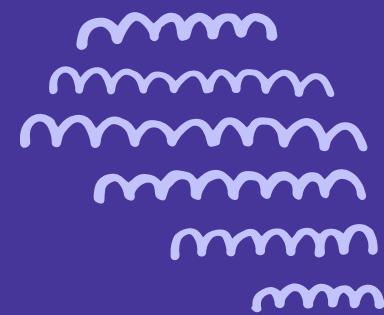
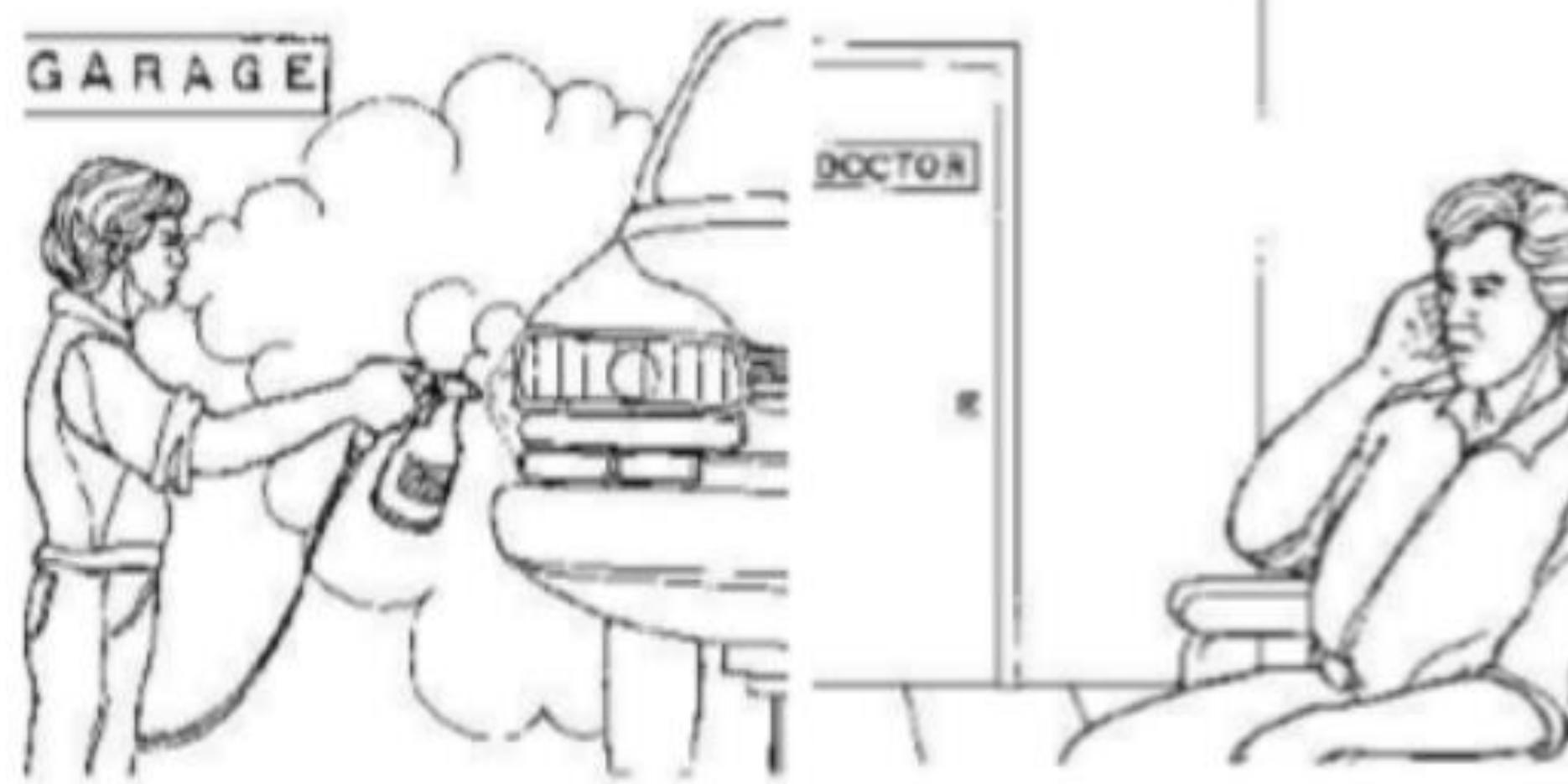




UNIT 2 – Evaluate Hazards and Risks

A. EFFECT OF HAZARD ON HEALTH

Exposure to hazards in the workplace can lead to serious illness.



In any workplace, hazard is built-in with it. We cannot deny the existence of danger since a workplace is a site where there are many risky conditions, materials or substances, tools and equipment, and practices which may bring jeopardy to humans, health, property or environment. In the previous topics you have identified the different sources of hazard present in a workplace.

Hazards are threat to human life or health whenever a person is performing his or her job in the workplace. Simply, a mechanic is exposed to threat most of the time from simple tools to equipment, from fumes to solvent.

Some occupational diseases have been recognized for many years, and affect workers in different ways depending on the nature of the hazard, the route of exposure, the dose, etc. Some well known occupational diseases include:

