14/12/20 Standard testing procedure & - Planning Monday

Paper-9 UNIT-IV

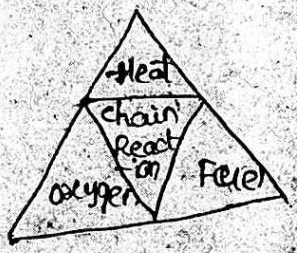
Short

Fire extinguisher:

Fire:- Fire is the rapid oxidation of a material in the exothermic chemical process of combustion, relasing agent heat. light and various reaction products.

In the Fire, There will be always be the same four elements present.

1. Fuel
2. heat
3. oxygen
4. chain Reaction



The Theory behind portable fire extinguisher is that the fire can be extinguished by removing any one (or) more of these four elements.

classification of fire

There are six classes of fire.

* class - A Fires : combustible solids: caused by flammable solids, such as wood, and fabric
* class - B Fires : Flammable liquids: such as Petrol, turpentine (or) paint
* class - C fires : Flammable gases: such as Hydrogen, butane (or) Methane

8:1

~~Safety rules at work place~~

* class-D Fires : combustible metals : chemicals such as Magnesium, aluminium (or) potassium

* class-E Fires : electrical equipment : once the electrical item is removed the fire changes class.

* class-F Fires : kitchen fire such as fats and oils.

Types of Fire extinguishers :

① water and Foam : The water component of this extinguisher removes the heat of the fire, while the foam compones removes the oxygen

works fore : class A fires only.

② carbon Dioxide : It replaces the fire's oxygen and as the gas is contained under pressure it creates a cold discharge upon release, which removes the heat of the fire too.

work's fore : class B and C fires

③ Dry chemical : this extinguisher removes The chemical reaction of a fire, and is the most used of all fire extinguishers because of it versatility across multiple classes.

works fore : class A, B and C fires (multi purpose)
class B and C cordinary)

④ wet chemical : This extinguishes remove heat and create a barrier between oxygen fuel so a fire cannot be re-ignited. The chemical is sprayed as

inist, cooling The fire's heating and creating a blanket effect over The fuel.

work fuel: class k fires (particularly good for fires started by oils or fats)

⑤ clean Agent: Also called Halogerated extinguishers these include Halogen agents and new, less ozone depleating halocarbon agents, which extinguish a fire by interrupting its chemical reaction.

works for: class B and C fires

⑥ Dry Powder: This works similary to the dry chemical extinguisher as the powder separates The fuel from oxygen or removes The heat, but This extinguishes is only used to fight combustible metal fires.

work for: class D fires.

⑦ water mist: this extinguisher takes away the heat of The fire only

works for: class A and C fires

→ large container that has chemical inside it)

⑧ cartridge operated Dry chemical:

This extinguisher interrupts The chemical reaction of the fire, and creates a barrier between The oxygen and The fuel and, like The dry chemical extinguishers, works well on a variety of fire types.

works for: class A, B and C fires

Safety Sign And Signals

The Term "safety sign" is relatively broad and basically means a visual indicator that covers a specific situation, object or activity and gives information or instruction on health and safety. Hand and audio signals may also be used.

To make sure and signals are quickly and readily understood by everyone there are a prescribed set of criteria, such as those of shape and colour, That must be used by law to indicate protibited activites, warn of particular hazards or to indicate safe conditions, as This topic describes.

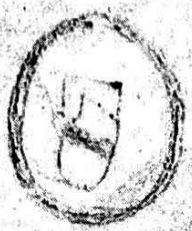
Safety signs - shapes and colours

signs may be

- Circular (which indicate "must do or mut not do")
- triangular for warning signs
- rectangular or square, which are used for safety information.

In addition there are tour different "colours" specified in the regulations, each of which has a particular meanine as follows.

Red : protibition



Red is used for signs showing actions that are not allowed. eg stop signs and no smoking signs.

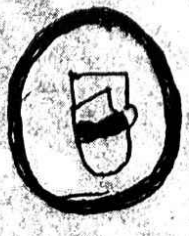
Note: Emergency stop devices are also coloured red to indicate the means of stopping a process equipment.

Note: Red is also used for fire-fighting sign, such as those for extinguishers and to show the location of fire-fighting equipment in this case, the sign will be rectangular or square shape to indicate safety information

Yellow: Warning

Yellow signs indicate a risk of danger. it is used to identify hazards such as fire explosion or chemical or to indicate where care should be taken to avoid a hazard such as obstacles or dangerous

Blue: Mandatory Action.



Blue indicates a mandatory action such as wearing a hard hat or ear protection in

Certain area. it is therefore, in effect, an instruction to used hard and ear protection in such areas.

Green : Safe condition

Green is used to indicate safety, such as emergency escapes and provision of first aid.

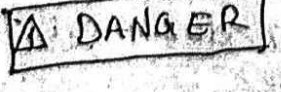
Safety Alert

Safety Alert indicates that a person should observe extra awareness

Prohibition :

Prohibition means that any activity is not allowed as stated by the symbol.

Danger



Danger specifies hazardous situation which, if not avoided, will result to a serial injury of even death

27.

Safety rules at work place

Industrial safety :- Refers to the protection of workers from the dange of Industrial accidents.

- safety means freedom from the occurence of risk (or) injury (or) loss.
- chemicals are used to make virtually every man - made product and play an important role in the everyday life of people around the world.

Objectives of industrial safety :-

- understand the harmful effects of industrial hazards.
- know the most toxic environmental substance
- It is needed to reduce (or) eliminate accidents causing work stoppage and production loss.
- It required to have better than relations within the industry.
- It is needed to increase production means to a highest standard of living
- It is

safety of various stages :

- planning stage, design stage, construction stage, operation stage, decommisioning stage and abondment

...ted from the injur...

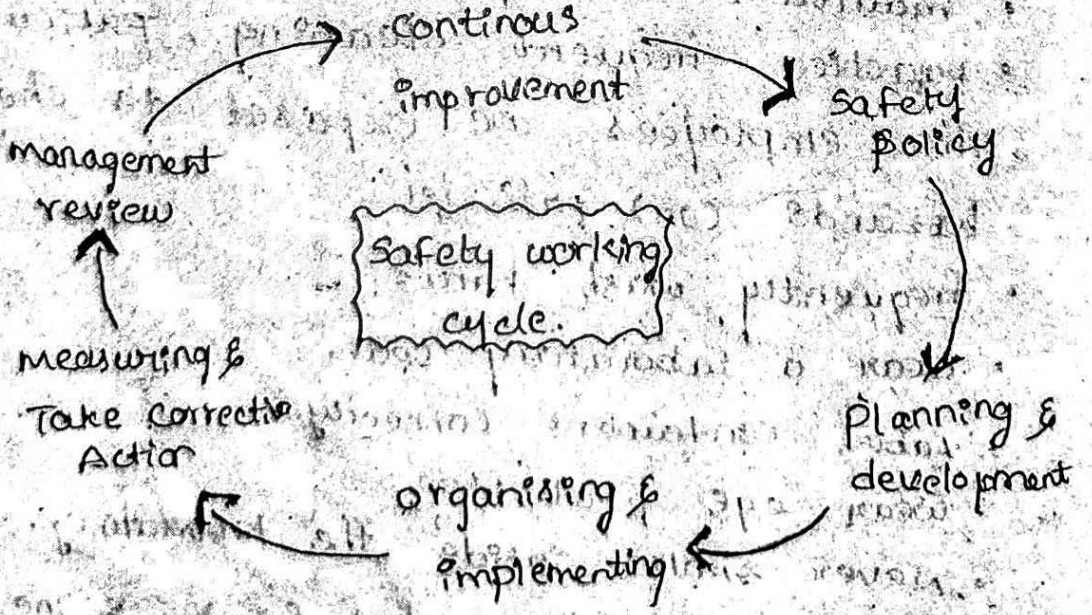
Safety at work place :-

- In all workplaces, employees must be mindful when it comes to heath, and safety.
- workeas are also legally obliged to take additional precautions when, it comes to working in hazardous environments.
- Not eat in the laboratory.
- keep corridors clean.
- Tie up long hair
- Regulary check that glassware is not cracked and that all equipment is safe to use
- Never mouth pipete.
- provide workers with a safe work on environment.
- quickly clearup all spillages
- maintain a tidy work area.
- papactice frequent cleaning, paticulardy The employees are exposed to chemical hazards (or) particles
- frequently wash hands.
- wear a laboratory coat.
- Label containers correctly
- wear eye protection
- Never smoke inside the labbratory
- Not wear clothing that expose the skin ex:- shorts, and T-shirts
- provide on-going safety training
- Never use any substance that is not properly labelled.

- Never understimate the potential hazard of any chemical (or) combination of chemicals
- Industrial automation has minimized the human interaction with the machines but has not completely eliminated it.
- Industrial safety systems are introduced to protect the human who works in hazardous plants.
- some examples of these are oil & gas, chemical and nuclear plant.
- know all the hazardous of the chemicals with which you work.

ex:- perchloric acid is a corrosive, an oxidizer, and a reactive.

- Benzene is an irritant that is also flammable, toxic and carcinogenic.



short
Personal protective equipment

Personal protective items such as safety helmets, gloves, PPE includes items such as safety clothing, safety - foot wear / safety harnesses, ear plugs, car defenders and respiratory protective equipment (RPE).

- In appropriate situations disposable PPE may be provided eg:- single use coveralls.

PPE importance

- PPE protects only the person using it, whereas measures controlling the risk at source can protect everyone at the work place.
- PPE may restrict the wearer by limiting mobility, visibility or by requiring additional weight to be carried decrease the
- use of PPE may employes perception of the hazards that they are dealing with.

Different types of PPE's :-

1. Head Protection :-

For prevention of head injuries protecting from falling objects, striking of head against objects, following PPE's are used.

- Hard hats
- Helmets
- Guards
- Accessaries

2. Hand protection :-

Chemically protective gloves are one of the most important tools of to minimize dermal exposures to chemicals in research laboratories

- work Gloves
- Gloves for chemical hazard
- Gloves for Mechanical hazard
- Gloves for thermal hazard.

3) Eye and Face protection :

eye protection is achieved by wearing goggles/glas wear specially designed to reduce the risk of exposure to chemical splashes.

1) safety glasses
- eye shields
- over spec
- visors
- safety goggles.

4. protective clothing.

For body proteation protective clothing is required.

- chemical
- Hi- Visibility clothing
- FE clothing
- weather wear
- work wear

5, Breathing Apparatus.

A self - contained breathing apparatus (SCBA) sometimes referred to as a compressed air breathing apparatus (CBA) is a device worn by rescue workers, fire fighters, and others to provide breathable air in an immediately

dangerous to life health atmosphere.

- escape sets
- working sets

6) foot protection

wear safety shoes when working in company Premises and gum boot when chemical might expose directly to foot / leg.

- safety foot / leg
- Esp foot wear
- Food industry hood wear

Essay

hazardous chemicals in pharmaceutical

Hazardous chemicals can be defined as Those that after the exposure have negative effects on worker's health or human's health

(or)

Hazardous chemicals are defined as "substances that can cause death or serious injury or damage to human health if ingested or inhaled or in contact with the skin" The hazardness of chemicals are depends on

1) It's toxicity
2) It's physical charecterstics

Toxicity :- Toxcity is the ability of a substance to cause damage to the boilogical tissue.

physical charecterstics :- the way of substance will be found for, Example, a high pressure steam liquid will reach a higher concentration on the air and will be more hazardous than an equally hazardous liquid with lowers vapour Pressure

Organic solvent Hazard

organic solvents are used in laboratories for synthesis, Extraction separation.

In chemical industries - they are widely used to dissolve and disperse fats, oils, waxes, pigments ...etc.

Characteristics of organic solvents :-

spills (edges) and solvent leakage cause signif -icant and water pollution. Inhalational exposure of volatite organic solvents and as easy absorption through the skin are the 2 most important ways of exposure to the workplace, many organic solvents have low flammability points and burn when they light up

ex:- Nitro cellulose

Hazardous gases

Various volatile and flammable gases are used in the chemical industry.

vapourize when Exposed to room temperature or above, causing atmosphere pollution. the steam turns on causing fire accidents and explosion, when tend to spread rapidly in the surrounding Environment causing loss of lives and property.

ex:- Methane (CH_4), pentane (C_5H_{12})

Health effects caused by chemical products

Acute (short term) effects :-

→ Appears immediately or soon after chemical exposure. They can be minor such as ~~irritated~~ irritation

of the nase or throat, or can be severe such as eye damage or chemical vapours
→ the only thing that is common with these effects is that the happen instantly.

chronic (long-term) effects :-

They are usually caused by continous or long term exposure to harmful substances. some chemicals can cause both acute & chronic effects. chronic effects sustain for longer periods