Pharmaceutics - II

Unit Operation:

It is a branch of science which deals with machine.

In this field we study about the principale, construction, working, uses and application of several types of instruments that are used in the drug manufacturing.

We also study several types of:-

- ✯ Chemical reaction
- ✯ Accidental record
- ✯ Humidity
- ✯ Air conditioning
- ✯ Temperature and many more things that are important in the drug manufacturing is called unit operation.

☆ Hazard :

Hazard is a term associated with a substance that is likelyhood to cause injury in a given environment or situation. Industrial hazard may be defined as any condition produced by industries that may cause injury os death to personal or loss of product and property.

☆ Safety :

Safety in sun simple term means freedom from occurence of risk or injury or loss.

Industrial safety refer to the protection of worker from the danger industrial accident.

☆ Types of Hazard :

(i) Mechanical Hazard
(ii) Electrical Hazard
(iii) Chemical Hazard
(iv) Physical Hazard
(v) Biological Hazard
(vi) Fire Hazard
(vii) Dust Hazard

(i) Mechanical Hazard

Mechanical hazard envolves injury caused by machine breakdown or failure can be avoided by periodically check of machine and prevent measures underitaken. That's why a mechanical hazard is envolving a machine process.

Causes:

i) Human error:

Not following the rules and procedure like removing the guard, putting hand on the running machine. They do cleaning of the machine while running.

Prevention:-

- Explain the precaution to the new worker. In their varnacular language.
- Salient feature may be written on the board and hang near to the machine.

ii) Loading more weight than working safe limit prescribed in the S.O.P.

Prevention :

Superwise periodically checks and point out to the operator ~~the~~ the mistake if overloaded.

iii) Machine are install in cramped position. (overcrowded).

Prevention :-

Have sufficient moving space around machine while installing them so that even machine cant attain to breakdown.

(iv) Getting hurt in running machine like mixture centrifuge.

Prevention:

Interlock switch shall be provided wherever possible by which machine will stop on opening the lid.

(ii) Electrical hazard :

Shock is one of the common electrical hazard. It's occur when electric current passes through the body. This is possible when human is in contact with conductor carrying current. Electrical hazard also refer as a short circuit.

Causes :-

→ Different sources of electrical hazard are short circuit electrostatics hazard and explosive materials.

→ A worker receive shock when touch two wire at different voltage at same time.

→ Touching the phase having wet cloth and high humidity.

→ Touching another person receiving an electrical shock.

Prevention :

→ Put off the main switch before attending to the machine for repair.

→ All electrical connection to be tight to prevention of spark.

→ In machine with three phase connection special switch available may be fixed. These trip off when the load is out of limit and ~~serve~~ save machine from damage.

(iii) Chemical Hazard:

In the chemical hazards solvent used and then they cause severe burns. If they contact with living tissue.

Living tissue may be destroyed by chemical reaction such as dehydration, digestion, oxidation likes reaction.

★ Causes with vapours or gas:

(i) Breathing problem and suffocation to worker.

(ii) Irritation or burn to eye and skin of the worker.

(iii) Explosion in work place

(iv) General anesthesia or death.
eg:- chloroform, ether.

☆ Causes with liquid chemicals.

- Dehydration by strong dehydrizing agent.
  eg. sulphuric in conc. form.
- Burning by strong acid and strong base. eg. HCl, NaOH.
- Oxidation by strong oxidizing agent eg. $KMnO_4$.

☆ Causes with dust of chemicals:

- Skin and eye irritation.
- Resistance to certain antibiotics.
- Dermitidis or dust allergy to the worker.

Prevention of chemical hazard.

- Before starting work with a chemical hazard pocketguide should be consulted for necessary information about the chemical will give the type of chemical reaction may be produced.
- No eating, drinking or smoking where chemicals are used.
- Skin should be covered with protected clothes.
- Face mask may be used in the toxic dust or gases.
- Worker working in the antibiotic related work must be changed routinely.

☆ Dust Hazard:

Exposure to dust can caused to irritation to the eye and respiratory tract. and ♭ Exposure can lead to a range of serious problem or lungs disease like COPD (chronic Obstructive Pulmonary Disease).

☆ Causes of Dust Hazard:

→ Grinding or mixing of drugs excipient or herbal product.

→ During weight dust may be spread in air.

→ During powder mixing dust may be generated.

→ During capsule filling and tablet punching operation dust may be generated.

- During coating operation dust are generated.

Prevention of dust Hazard.

* Filtration :

Air is ~~sor~~ sucked in suitable filter media like :- paper, wool, cotton wool and nilon bag can be attached with machine where dust is produce.

* Inertial separator:

In cyclone separator air is circulated at high speed in a spiral manner due to centrifugal forces. The dust particles through outside and large particle are collected at the bottom and clean air out through the top.

(vii) Fire Hazards

Fire hazard is an exothermic chemical reaction between oxygen and fuel at certain temperature.

The three necessities for fire :-
(i) Fuel :- some fuel, wood, paper.
(ii) Oxygen
(iii) Temperature or heat.

✱ Causes of fire :

- Many of the fire and explosion are caused by carelessness and bad housekeeping.
- Fire can happen due to electric spark in the light.
- Steel nail contamination in high speed grinding machine.

- Creating a fire source like :- open lights, lighted cigerette in an highly inflammable working area against the instruction.

* Types of Fire class :

(i) Class A fire
(ii) Class B fire
(iii) Class C fire
(iv) Class D fire

(i) Class A Fire

These are the fire in ordinary combustible material such as :- wood, cloth, paper etc.

(ii) Class B Fire

These fire involve inflammable petroleum product like liquid, gas and grease.

eg. Liquid :- Petrol, Diesel, kerosene
Gas :→ LPG, CNG, Methane
Grease :

(iii) Class C Fire

These ~~fire~~ fire involve energise electrical equipment. eg. Motor.

(iv) Class D Fire

There are fire in combustible metal. eg. Sodium.

* Prevention of Fire :

→ Electrical wiring of all establishment to be checked periodically. defects if any found shall be erectified.

→ Having a bar magnet fixed above feeding hopper of crude drug grinding machine which will attract and take steel nail contamination.

from their wooden packing boxes.

* Following all safety rules and precautions.

- Not operating electrical switches when gas is smell in the area.

→ Safety poster available may be put on the notice board which will be more appealing and will be registered in the minds of people.

Accident Record :

A lateral meaning of word accident is unpleasant accident that happens unexpectedly is called accident.

Type of accident

All the accident occured in the factory shall be recorded. They shall be classified into two category.

i) Minor accident
ii) Major accident

i) Minor accident

Accident where the injured person has been treated by first-aid or treated in the hospital outpatiently and sent home.

Accident where the damage and loss of chemical property is local in nature and not use.

ii) Major accident

Accident where injured person has been admitted as inpatient and hospitalized where a part of the body affected and permanently disabled. Where ~~fire~~ fire has spread to more area and loss of property is huge.

Accident Records

All accidents minor and major shall be recorded with the following inputs.

i) Date of accident

(ii) Area of accident, section or department.

iii) Human beings affected details.

iv) Property loss.

v) Fast information of the probable reason for the fiare concern worker and supervisor view.

vi) Any lapse in the following system GMP, GLP, other safety precaution.

vii) Investigation and report of the expert body or safety committee of the organisation.

viii) Suggestion for improvement and to avoid reoccurrence of the similar accident.

(ix) ~~If~~ Steps taken to action report.

Industrial Dermatitis

Occupational dermatitis is a skin disorder caused by coming into contact with certain chemical products in the workplace.

Two types of occupational dermatitis:
- → Allergic dermatitis
- → Contact (irritant) dermatitis

Cause of occupational dermatities:

→ Occupational dermatitis include clearing products, organic solvents, metalworking fluids, cement, adhesives, other chemical, and even certain plants.

Caused by chemicals:-
ICD can also be caused by the cumulative effect of substances, such as water, soaps, detergents and solvents.

✱ Industrial dermatitis treated / treatments for occupational dermatitis:-

(i) Appropriate skin protection :-
Use of the right gloves for the job.

(ii) Use of moisturing creams.
(iii) Soap substitutes.
(iv) Topical steroids.
(v) Antibiotics.
(vi) Systemic therapy (oral tablets or injections).

✱ Symptoms of occupational dermatitis

→ Itching, pain, redness, swelling and the formation of small blisters